L 04417-67 EWT(1) IJP(c)

ACC NR: AP6034273 SOURCE CODE: UR/0386/66/004/007/0267/0270

44
41
B

AUTHOR: Lutskiy, V. N.; Korneyev, D. N.; Yelison, M. I.

ORG: Institute of Radio Engineering and Electronics, Academy of Sciences SSSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

TITLE: Observation of quantum size effects in bismuth films by the method of tunnel spectroscopy

27 18

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 7, 1966, 267-270

TOPIC TAGS: bismuth, silver, tunnel effect, volt ampere characteristic, quantum oscillation, electronic thin film

ABSTRACT: The authors report the results of an experimental investigation of tunnel systems containing size-quantized bismuth films, since theory predicts that the current-voltage characteristics of such a system should reveal a number of specific features that yield information on the structure of the carrier energy spectrum. The measurements were made on Bi (thin film) - dielectric - Bi (thick film), Bi (thin film) - dielectric - Ag, and Bi (thin film) - dielectric - Bi (thin film) systems (Fig. 1). Vacuum rather than a solid dielectric was used for the gap to eliminate parasitic effects. The tunnel system was placed in liquid nitrogen during the measurements. The bismuth films were obtained by evaporation on hot mica in vacuum. The investigated samples ranged from 800 to 1300 Å in thickness. The volt-ampere characteristics of

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ACC NR: AP6034273

the Bi-Ag system and of the Bi (thin film) - Bi (thick film) system show clearly the presence of the expected quantum oscillations. The non-monotonic character of the current variation is even more pronounced when the obtained characteristics are differentiated. The experimentally obtained values of the Fermi energy lie in the range between 0.02 and 0.027 ev, i.e., they are close to the known values of the Fermi energy in bulk bismuth. The distance between the singularities on the volt-ampere characteristic yield an estimate of $\sim 0.012 m_0$ for the component of the effective mass of the electrons in Bi corresponding to the direction of the trigonal axis. This is in good agreement with the known values obtained from measurements of the de Haas - van Alphen effect. The authors thank V. B. Sandomirskiy and Yu. F. Orgin for a discussion of the paper and V. A. Krupennikova for help with the experiments. Orig. art. has: 3 figures.

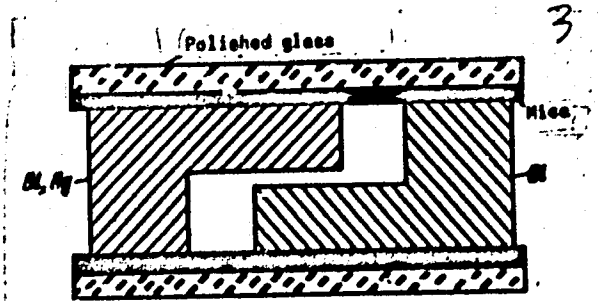

Fig. 1. Diagram of tunnel system

SUB CODE: 20/ SUBM DATE: 09Jul66/ ORIG REF: 004/ OTH REF: 003

Card 2/2 vmb

SILICH, M.I.; SIDOROV, I.P.; MARTYNOVA, L.L.; BUKAROV, A.R.; YULUSOV, A.A.; KISIL', I.M.; Prinimali uchastiye: KUZNOVA, G.N.; YEROFEYEVA, A.D.; MALYGINA, N.M.; KHOZHLOV, A.I.; ZAYTSEVA, A.I.; YELISOVA, T.V.; BUSYGINA, A.I.

Improved technological system with a suspended catalyst for the production of alcohol by oxo synthesis method. Khim.i tekh.topl.i masel 6 no.8:19-24 Ag '61. (MIRA 14:8)

1. Gosudarstvennyy institut azotnoy promyshlennosti; LKhK; Opytno-konstruktorskoye byuro po avtomatike.
(Alcohols) (Oxo process)

YELISTRAKHOV, V.I., tekhnik.

Preventing the contamination of oil by water and oxidation in the oil system of turbines. Energetik 4 no.9:10 S '56. (MLRA 9:10)
(Turbines) (Oils and fats)

L 07221-67 EWT(1) GW

ACC NR: AP6027314 SOURCE CODE: UR/0428/66/000/002/0109/0114

AUTHOR: Hanich, P. Ya.; Yelistratav, I. F.; Ilych, H. K.; Levin, I. M.; Lamanosava, T. M.; Makarevich, S. A.

39
B

ORG: none

TITLE: Optical characteristics and light field parameters of lake water

SOURCE: AN BSSR. Vesti. Seryya fizika-matematychnyckh navuk, no. 2, 1966, 109-114

TOPIC TAGS: optic property, water, light diffusion, light refraction

ABSTRACT: This work examines methods and certain results of defining the optical parameters of lake water and also studies the light-field in that medium created by direct and diffuse radiation sources. To measure total light attenuation by water the authors used a transparency meter which is described in the text. Light attenuation is given for 13 wavelengths on 5 separate days. Maximum transparency is shifted towards longer wavelengths in comparison to seawater. To evaluate visibility of objects under water both the total index of attenuation by the water and the relations between indexes of actual attenuation and dispersion must be known. A formula is derived and tabular data given which show that change in lake water transparency occurs in such a way that the absorption-to-dispersion ratio remains the same. Washing-out of a collimated beam of light is studied by having an underwater light source send a

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L 07221-67

ACC NR: AP6027314

beam vertically downward. The receiver is moved vertically and horizontally to measure illumination in planes perpendicular to the light source axis. Background radiation diffused by the water was studied with a light source and a brightness meter which turned at a polar angle of 0 ± 180° and at an azimuthal angle of from 0 to 75°. Patterns of change of brightness with depth were photoelectrically measured with a special underwater light source, direct photography of which, with subsequent microphotometry, gave the same result. Orig. art. has: 3 formulas, 2 tables, and 4 figures.

SUB CODE: 20/ SUBM DATE: 23Oct65/ ORIG REF: 007/ OTH REF: 004

Card 2/2

YELISTRATOV, A. (Leningrad)

Universal device. Pozh. delo 8 no.9:23 S '62. (MIRA 16:11)

YELISTRATOV, A.I.

ANDRIYEVSKIY, I.I.; YELISTRATOV, A.I.

Course of experimental tuberculosis in fetal development [with summary in French]. Probl.tub. 35 no.2:67-72 '57. (MLRA 10:6)

1. Iz kafedry patologicheskoy anatomii Novocherkasskogo zooveterinarnogo instituta (i.o.zav. kafedroy - dotsent I.I.Andriyevskiy).

(TUBERCULOSIS, exper.
in fetal guinea pigs & rabbits (Rus))
(FETUS, dis.
tuberc., exper., in guinea pigs & rabbits (Rus))

YELISTRATOV, A. M. PA 32/49T60

USSR/Metals Sep 48
Solid Solutions
Iron

"Certain Peculiarities of the Initial Stages in the Decomposition of an ε-Solid Solution in the System Iron-Nitrogen," A. M. Yelistratov, All-Union Sci Res Inst of Metrol, Sverdlovsk Affiliate, 6 pp

"Zhur Tekh Fiz" Vol XVIII, No 9

Discovers and investigates effect of uneven washing out ("razmytiye") of Debye lines of the ε-phase in system Fe-N. Establishes its

32/49T60

USSR/Metals (Contd) Sep 48

connection with decomposition of supersaturated solution $\varepsilon \rightarrow \zeta + \gamma'$. Suggests theory to explain effect and compares theoretical conclusions with experimental data. Submitted 20 Jan 48.

Comments and evaluation B-78524, 8 Sep 54

32/49T60

CA

3

X-ray investigation of structural changes in aging coarse-grained polycrystalline alloys. A. M. Elistratov (Sverdlovsk Branch, All-Union Sci. Research Inst. Metrology). *Doklady Akad. Nauk S.S.S.R.* 69, 337–40 (1949). A method based on the use of various characteristic x-ray radiations to obtain reflection spheres of various sizes was used to analyze anomalous diffraction effects in a polycryst. Cu-Be alloy aged 1 hr. at 230°. Sep. exposures were made with each radiation but the position of the specimen was const. and so the main Laue spots remained fixed on the film. Only the anomalous reflections changed from one radiation to another. Thus, the method has advantages over the use of a rotating crystal with a single type of radiation. An analysis was made in the vicinity of 1 Laue spot whose indices (hkl) were detd. from the reflection of a characteristic radiation from the corresponding crystal plane. The x-direction on the film connected the exit-beam hole and this Laue spot; the y-direction was at right angles. The corresponding orthogonal axes in reciprocal space were: X connecting the (000) point and (hkl); Y lying in the plane of reflection for the (hkl) Laue spot and passing through (000); Z mutually perpendicular to X and Y. The relations among these coordinates then was: $X = r \sin(\psi - \theta + R \sin\theta$, $Y = -r\cos(\psi - \theta) + R\cos\theta$, $Z = C$; where $R = 1/\lambda$, λ = wavelength of radiation, D = film-to-specimen distance, $\psi = \arctan x/D$, $r = R[(\sqrt{X^2 + D^2}/(\sqrt{X^2 + }$ $)^2 + D^2]$, $\zeta = \sqrt{R^2 - r^2}$. The results obtained agreed with those previously detd. A. G. Gyn

1951

CH VERSTRATOV, A.M.

3

Anomalous diffraction effects in x-ray patterns of aging polycrystalline alloys. A. M. Glazkov, S. D. Finkel'shtein, and A. I. Padalov. *Doklady Akad. Nauk S.S.S.R.* 68, 1017-20(1949).—A "coarse-grained" x-ray method is described to replace the single-crystal techniques generally used. The grain size was about 0.02 mm. A Zeeman-type rotating electrode tube with a sharp line focus 0.2×0.3 mm. wide was used. At 18 to 30 kv. the background intensity was small compared to the characteristic lines. The Laue method was used with flat or cylindrical films. Wire specimens had a diam. of 0.3 to 1.0 mm. Two-dimensional diffraction effects appeared in a Cu-2.02% Be alloy as early as after aging for 1 hr. at 180°, and disappeared after aging for 1 hr. at 320°. Characteristic extra streaks were obtained if the incident beam direction was parallel or almost parallel to the plane of a Guinier-Preston zone. In Cu-Be they were never observed in the vicinity of a (111) spot. In the immediate vicinity (0.3-0.5°) of the Laue spot, the intensity of the extra spots could be greater than the spot if low voltage was used and a long-wave characteristic radiation. Exposures of 1-2 hrs. were used in this case. Much weaker "white streaks" were also obtained if long exposure times were used at high voltages. Two-dimensional effects were also found in a Ag-7.5% Cu alloy aged for 3 min. at 280°, and in Fe-Ni-Al magnetic alloy aged 10 min. at 750°. In Al-Ag and Cu-Be alloys very weak one-dimensional diffraction effects were observed in the form of small, thin circles, or thin, short, slanting lines coming from extra two-dimensional diffraction spots, or as long, thin lines going through extra spots. On changing the wave length they either displace themselves with the extra spots, remain almost parallel with their previous position, or disappear. "Two-crystal" diffraction effects, weak white streaks, were obtained from Cu-Be alloy aged 1 hr. at 230° by 12-14 hrs.' exposure. With change in wave length they either disappeared or sharply changed direction. This effect was not observed with grains greater than 0.3-0.4 mm., and was observed best with nonuniform grain size. One crystal acts like a monochromator. The ratio of two-crystal effect intensity to the intensity of a Bragg reflection is 1.2×10^{-6}, the same as the ratio of central diffraction to initial beam intensity. The size of the Guinier-Preston zone calcd. from this effect agreed with that obtained from central diffraction. The coarse-grained x-ray method is useful at least with heavy alloys.

A. G. Guy

YELISTRATOV, A. M. 158T84

USSR/Physics - X-ray Analysis 21 Nov 50
Crystals

"X-Ray Method of Investigating Structural Changes in Aging Coarse-Grained Polycrystallic Alloys," A. M. Yelistratov, Sverdlovsk Affiliate, All-Union Sci Res Inst of Metrol, 4 pp

"Dok Ak Nauk SSSR" Vol LXIX, No 3

Proposes theoretical bases ("in principle") of a method that permits one to solve problem of analysis and complete crystallographic "deciphering" at contact diffraction pictures observed in roentgenograms of aging polycrystallic alloys, in connnection with Laue-spots. Submitted 22 Sep 49 by Acad I. P. Bardin.

158T84

CA

4

X-ray method of investigation of initial aging stages in polycrystalline alloys. Investigation of abnormal dispersion by macrocrystalline samples. A. M. Elistratov. *Izvest. Akad. Nauk S.S.S.R. Ser. Fiz.* 15, [illegible] (1951). cf. *C.A.* 45, 8317*e*.—X-ray pictures from polycryst. large-grain samples can be interpreted by constructing "regions of abnormal dispersion" in the Fourier space. Cross sections of this region are obtained by varying the wave length of the characteristic radiation by using a demountable tube with Zn, Cu, Ni, Co, Fe, or Cr anodes. A series of equations is established from which the nodes *hkl* of the single crystals are obtained. Results obtained with Al-Cu, Al-Ag, Al-Zn, and AlMgSi alloys show the same effects as previously found on monocrystals. Study of the 2% Be-bronze and the Alni alloy (Fe_2NiAl) show new diffraction effects on aging, indicating the formation of small regions (~ 25 A.) of the final phase. Aging effects are also discussed in alloys Ag-Cu (0.5% Cu) and Cu-Ag (0% Ag). It is shown that the abnormal dispersion is given by the "holes" in the supersatd. solid soln. and by the formation of regions with new structure.

S. Paksver

1. YELISTRATOV, A. M.

2. USSR (600)

4. X-Rays-Diffraction

7. Scattering of X-rays by crystals of an ageing alloy. Dokl.AN SSSR 87 no. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

YELISTRATOV, A. M.

Chemical Abstracts
May 25, 1954
General and Physical
Chemistry

X-ray analysis of the initial stages of aging of beryllium bronzes. A. M. Elistratov, S. D. Pinkel'shtein, and T. Yu. Gol'dshtein (Sverdlovsk Branch, All-Union Sci. Research Inst.). *Doklady Akad. Nauk S.S.S.R.* 88, 667-72 (1953); (Engl. (translation issued as *U.S. Atomic Energy Comm.* NSF-tr-03, 5 pp. (1953)).—In order to obtain supersatd. solid solns., the Be bronzes with 2.02% Be were heated at 880° and quenched in water. The x-ray photographs of these samples showed no anomalous x-ray scattering. After tempering at 160° or natural aging for one year, very weak and diffuse reflection maxima occur, which coincide with (110) and (002) of the γ-phase. By tempering for 1 hr. at 180° diffuse extra spots appear in the vicinity of the Laue spots of the α-phase. The form and dimension changes of the anomalous scattering are described. The existence of two types of regions of the anomalous scattering leads to the following conclusions: during the early stage of the aging small (25 × 50-A.) γ-structure platelets are formed. After being tempered at 25° the platelets grow by the addn. of newly formed γ-structure regions into blocks which are parallel to (110) of the α phase. The width of the blocks is 700 A.; their thickness, however, remains almost unchanged (25 A.). F. Schossberger

ELISTRATOV, A.M.

Chem Abs V48
1-25-54
Metallurgy + Metallography

X-ray study of the aging of an aluminum-zinc alloy. A. M. Elistratov. *Doklady Akad. Nauk S.S.S.R.* 88, 803–6(1953).—The diffuse scattering of x-rays with coarse-grained specimens was used to study the initial stages of aging of an Al alloy with 25 wt. % Zn. Hardening is known to be very slight as compared to beryllium-Cu (*C.A.* 44, 5698f). Wire specimens (0.1–0.5 mm. diam.) were held at 440° for 2 hrs. and quenched in ice water. Grain size varied from 0.1 to 0.02 mm. Directly after quenching, diffuse, fairly intense extra spots were observed in the vicinity of the Laue spots. These were not thermal max. but result from structural changes. Upon annealing 2 hrs. at 120°, the intensity and sharpness of these extra spots increased. Streaks of very low intensity (straight or curved) were then found to intersect the extra spots. The regions of anomalous scattering (I) were almost spherical, with the center at the nodes $(200)_\gamma$ and $(111)_\gamma$ of the reciprocal lattice (γ-phase solid soln.). The first surface of null intensity surrounded I with a diam. of 0.02 $1/d\ (100)_\gamma$, where $d(100)_\gamma = 4.036$ A. Further surfaces were less intense and were of the order 0.13 $1/d\ (100)_\gamma$. Upon annealing at a 130° for 1–2 hrs. the extra spots showed a series of intermediate forms, ending as typical "2-dimensional" and linear diffraction effects. Aging was not simultaneous in all crystals. A 2nd stage was observed upon aging at 200° for 1 hr. The extra traces became very intense and sharp, in some cases forming "crosses" at several Laue spots. The streaks of very low intensity were sharper and in some cases surrounded by a fairly intense extra spot. I were significantly more complex than in the first stage and resembled the changes in Cu-Be (*vide supra*). At the end of the 2nd stage, very intense and sharp extra traces appeared (pptd. Zn). It was concluded that I observed in the first stage derive from a breaking of the γ structure. The presence of a surface of very low intensity in I indicates a center of symmetry at the region of breaking. The diam. of this region is 55 A. after annealing at 100°. In the 2nd stage, the breaking occurs parallel to (111) γ planes and widens into a lamella of indefinite thickness (50–60 A.) growing to 400 A. after 1 hr. at 200°. These dimensions are many times greater than those computed by Geisler, *et al.* (*C.A.* 37, 1968[3]). The transition from the γ (Al) to α (Zn) phase requires contraction and expansion. Contraction produced by one "embryo" compensates the extension in the same direction produced by a 2nd embryo. This compensation (absent in Cu-Be) explains the lack of hardening. R. D. Misch

USSR/ Physics

Card 1/1 Pub. 22 - 18/51

Authors : Elistratov, A. M.

Title : X-ray study of retarded decomposition phases of a supersaturated alpha-solid beryllium solution in copper

Periodical : Dok. AN SSSR 101/1, 69-72, Mar 1, 1955

Abstract : The results obtained by studying the structural changes occurring in the alpha-phase crystal during retarded stages of decomposition are described. The phenomena developing in the alpha-phase crystal during the decomposition were found to be analogous to the phenomena observed during external deformation and relaxation of pure metals. The process of decomposition of a supersaturated alpha-solid CuBe solution is considered as a unique process of establishing a diphase equilibrium state and not as a unilateral process of formation of the gamma-phase. The mechanism of structural decomposition of CuBe is explained. Ten references: 6 USSR, 3 French and 1 English (1944-1953). Illustrations.

Institution : Institute of Mechanization and Electrification of Agriculture, Chelyabinsk

Presented by : Academician G. V. Kurdyumov, October 11, 1954

ELISTRATOV, A.M.

USSR/Physics - Crystallography

Card 1/1 Pub. 22 - 20/43

Authors : Elistratov, A. M.

Title : Analysis of the first stages of decomposition of Ag-Al satiated Θ-solid solution by the Roentgen method

Periodical : Dok. AN SSSR 101/3, 473-476, Mar 21, 1955

Abstract : Experimental data are presented on the structural deformations in the crystals of Ag-Al solid solution (Θ -phase) in the early stages of their decomposition. The Roentgen method was used in the experiments. [illegible] references [illegible] and 3 German [illegible] Photoplates.

Institution : Chelyabinsk Institute of Farm Mechanization and Electrification, Chelyabinsk

Presented by: Academician G. V. Kurdyumov, August 21, 1954

YELISTRATOV, A. M.

"Deformation Phenomena of Precipitation on Solid Solutions."

paper presented at the Conf. on Mechanical Properties of Non-Metallic Solids.

Leningrad,USSR, 19-26 May 1958.

Inst. of Semiconductors of the Acad. Sci. USSR, Leningrad.

5 (4)
AUTHORS: Yelistratov, A. M., Kamadzhiyev, P. R. SOV/20-125-3-20/63

TITLE: An X-ray Investigation of the Decomposition of Supersaturated Solid Solutions of Low Solubility (Rentgenovskoye issledovaniye raspada peresyshchennykh tverdykh rastvorov s maloy rastvorimost'yu). The Decomposition of a Supersaturated Solid Solution of Copper in Germanium (Raspad peresyshchennogo tverdogo rastvora medi v germanii)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 538-541 (USSR)

ABSTRACT: The present paper gives the preliminary results of the investigation specified in the title. The regions of anomalous scattering which are caused by a breach in the matrices (matritsa) can be observed only in the surroundings of the knots of the inverse lattice of the matrix. The authors, therefore, investigate only these surroundings. They used Ge samples which were sawn out of some large monocrystals of the p- and n-type. Mechanical treatment of Ge causes intense diffraction effects on the radiographs (because of the disturbance of the structure of the surface layer of germanium). The supersaturated solid solution of Cu in Ge was

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SOV/20-125-3-20/59

An X-ray Investigation of the Decomposition of Supersaturated Solid Solutions of Low Solubility. The Decomposition of a Supersaturated Solid Solution of Copper in Germanium

prepared by diffusing Cu into Ge at the temperature of maximum solubility. The further treatment of the samples is discussed in short. The authors investigated the isothermal decomposition of a supersaturated solid solution at the temperatures 550, 625, and 670° in the environment of the knots (111), (220), (311) of the inverse lattice of Ge. The diffraction pictures are changed in the following way: The radiographs of the hardened alloyed samples have Laue spots and thermal diffusion maxima. Exactly the same diffusion maxima were observed also on the radiographs of the initial (non-alloyed) samples. If the concentrations of copper are lower than the saturation value, the effects of two-dimensional diffraction are by far less intense, and they appear after a more protracted tempering. The following conclusions may be drawn from the experimental results: 1) The effects of two-dimensional diffraction and their subsequent development during the tempering at low temperatures are caused by structure variations in the crystal of a supersaturated solid solution of Cu in Ge during the decomposition.

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An X-ray Investigation of the Decomposition of Supersaturated Solid Solutions of Low Solubility. The Decomposition of a Supersaturated Solid Solution of Copper in Germanium SOV/20-125-3-20/63

2) The effects of two-dimensional diffraction cannot be explained by a scattering from the Guinier-Preston zones or from the "germs" of the removed phase because of the extremely low concentration of Cu in the solid solution. 3) It is not probable that these effects are caused by irregularities of the "packing" of the layer. 4) Consequently, it may be assumed that the extra-spots observed (effects of two-dimensional diffraction) are caused by the shape of the submicrocracks. 5) The formation of little bows and the splitting of the effects of two-dimensional diffraction in the later stages of decomposition are caused by the formation of disordered blocks in a germanium crystal in the interior of which the submicrocracks are conserved. Despite the extremely small concentration of Cu in Ge, the structure changes which are growing in the matrix during the decomposition are so great that they exert well observable diffraction effects on the radiographs. 7) As to the decomposition of a supersaturated solid solution of Cu in Ge (formation of submicrocracks and subsequent development of a block structure), the general

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An X-ray Investigation of the Decomposition of Supersaturated Solid Solutions of Low Solubility. The Decomposition of a Supersaturated Solid Solution of Copper in Germanium

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character of the observable structure changes is quite similar to the deformation phenomena which occur during the decomposition of the solid solution CuBe. The author thanks R. A. Zvinchuk for his help and useful discussions. There are 4 figures and 8 references, 2 of which are Soviet.

ASSOCIATION: Institut poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors of the Academy of Sciences USSR)

PRESENTED: July 9, 1958, by A. F. Ioffe, Academician

SUBMITTED: July 26, 1958

Card 4/4

S/181/60/002/010/006/051
B019/B070

AUTHORS: Yelistratov, A. M. and Zvinchuk, R. A.

TITLE: Formation and Dissolution of Heterogeneous Regions in Single Crystals of Solid Solutions (K,Na) Cl

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 10, pp. 2370-2383

TEXT: The decomposition and rehomogenization of solid solutions of (K,Na)Cl whose compositions are nearly in equimolar proportion, were studied here by three methods; 1) By Laue diffraction patterns. 2) By microscopic studies with linearly polarized light in which the time variation of brightness was investigated. 3) By photometric investigations of the opacifying of crystals of solid solutions. In the individual sections of the paper, the authors discuss the changes during decomposition and rehomogenization of the solid solutions in: Laue diagram, state of elastic stresses of the single crystal of equimolar solutions at the beginning of the decomposition, the opacifying of the crystal of equimolar solutions on decomposition, and the relations between the effects observed and their interpretation. Results relating to the time variation and the

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Formation and Dissolution of Heterogeneous Regions in Single Crystals of Solid Solutions (K,Na) Cl

S/181/60/002/010/006/051
B019/B070

dependence on temperature of the effects observed lead to the conclusion that the decomposition of the solutions studied here takes place in two stages. In the first stage there appears a spontaneous formation of local heterogeneous regions which are microscopically small. In the second stage, there occurs a recrystallization of the equilibrium phase. The microscopically small regions formed in the first stage grow at the cost of others having the same composition. The stresses between these heterogeneous regions formed in the first stage and their surroundings decrease in the second stage by the growth of the heterogeneous region. The continuity and disorientation are destroyed in the heterogeneous region. Heating of the disintegrated solution above the solubility temperature T_s results in a dissolution of the heterogeneous regions, that is, a rehomogenization takes place. There are 11 figures, 1 table, and 26 references: 5 Soviet, 3 Dutch, 9 German, 7 US, 1 British, and 1 Indian.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors of the Academy of Sciences USSR, Leningrad)

SUBMITTED: March 17, 1960

Card 2/2

ELISTRATOV, A.M.; KAMADZHIYEV, P.R.

Investigation of the decay of a supersaturated solid solution of Cu in Ge. Fiz. tver. tela 2 no.11:2950-2960 N '60. (MIRA 13:12)

1. Institut poluprovodnikov, AN SSSR.
(Copper) (Germanium) (Solutions, Solid)

40881

S/181/62/004/009/012/045
B108/B186

24.7200

AUTHORS: Yelistratov, A. M., and Yefimov, O. N.

TITLE: The influence of periodicity disturbances on the effect of the abnormal passage of X-rays. Integral characteristics for the abnormal passage of X-rays

PERIODICAL: Fizika tverdogo tela, v. 4, no. 9, 1962, 2397 - 2410

TEXT: The passage of X-rays through n-type Ge single crystals was investigated using a double crystal spectrometer with Bragg reflection (220) and the crystal position (2,-2). Thick specimens in the range $3.14 \leqslant \mu t \leqslant 82.4$ were used, wherein only the abnormal component of the split beam has a noticeable intensity since it is less absorbed than the normal component. Specimens of various thicknesses exhibiting low dislocation concentrations were used to measure the integral intensities of the abnormal transmission (T_i) and of the Laue reflection (R_i) (Fig. 2). The measurements showed that for thick crystals $T_i = R_i = i$. The linear relation $\ln i = \mu_i t + y_i$ can be usefully applied in practice, since changes in

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The influence of periodicity...

the integral coefficient of the interference absorption, μ_i and in the integral characteristic y_i due to lattice defects provide a measure for the latter. Theoretically, these characteristics are derived from the relations governing the relative intensities of the rays allowed to pass through and those reflected according to Laue:

$$\mu_i = \frac{\mu}{\gamma} - \frac{B}{t} = \frac{\mu}{\gamma} - \frac{\pi k C^2 \Psi_h' t}{t\gamma\sqrt{\Phi_h C^2}} = \left(\mu - \frac{\pi k C \Psi_h}{\sqrt{\Phi_h}}\right)\frac{1}{\gamma}. \quad (36),$$

$$y_i = \frac{1}{2}\ln A = \frac{1}{2}\ln(\Psi_h \cdot C^2). \quad (37).$$

$\gamma = \cos\Theta_{Bragg}$, μ is the normal coefficient of photoelectric absorption, k is the wave vector, t is the thickness of the specimen, $\Phi_h = \gamma_{rh}^2 - \lambda_{ih}^2$, $\Psi_h = {}^2\lambda_{rh}\,\lambda_{ih}$. C=1, if the displacement vector is normal to the scattering plane, whereas $C = \cos 2\Theta_{Bragg}$, if it is positioned in the scattering plane.

There are 4 figures and 1 table.

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S/181/62/004/009/012/045
B108/B186

The influence of periodicity...

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR Leningrad)

SUBMITTED: April 10, 1962

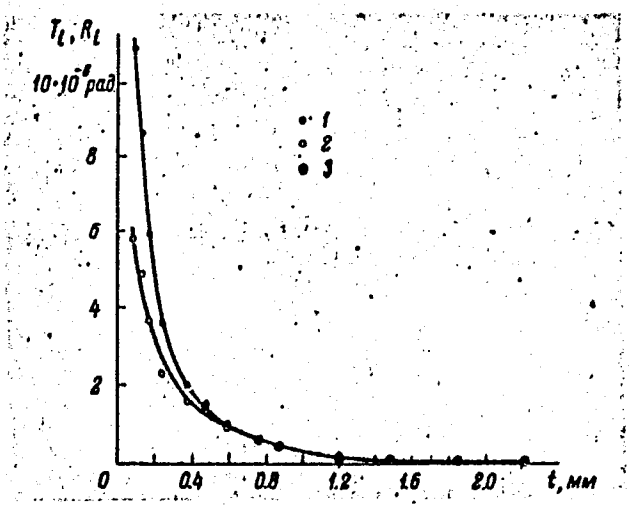

Fig. 2. T_i and $R_i(10^{-6}$ rad) versus t(mm).

Legend: (1) Passage, (2) Laue reflection, (3) passage and Laue reflection.

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44151

S/181/62/004/010/042/063
B102/B112

24.7000

AUTHORS: Yefimov, O. N., and Yelistratov, A. M.

TITLE: Influence of the dislocation density on the effect of the anomalous penetrability of X-rays into germanium

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2908-2916

TEXT: The effect of the dislocation densities on the integral intensity T_i of the anomalous penetrability and on the Laue reflection (integral intensity R_i) of X-rays was studied on 8 n-type and one p-type high-purity germanium single crystal with resistivities between 7 and 40 ohm·cm and dislocation densities between 0 and 10^5 cm^{-2}. The (220) plane was chosen as reflection plane since it not only ensures a high intensity but is also the most favorable for the experiments. As the Burgers vector lies mainly in the [110] direction all directions perpendicular to (110) are distorted. Since the effect of the impurities has not hitherto been explained, the samples studied were those of highest purity, i. e., that showed a maximum resistivity and a maximum mean free path. ln T_i

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and ln Ri as functions of the crystal thickness t, are proved to be independent of the dislocation density in the dislocation density range $0-1.5\cdot10^5$. According to the intensity-versus-thickness curves, 3 regions can be distinguished: thick crystals ($\mu t > 29$) for which the curves are linear, $\ln i = -\mu_i t + y_i$, $T_i = R_i = i$; intermediate crystals showing a deviation from linearity and the beginning of a divergence; thin crystals ($\mu t < 7.4$). In continuation of earlier studies (FTT, 4, 9, 1962) it can be shown that the integral coefficient of interference absorption μ_i can be approximated by the relations $\mu_i \simeq (\mu - 2\pi k C \chi_{ih})\frac{1}{\gamma}$ and $y_i \simeq \ln(\chi_{rh} C)$. μ is the ordinary photoelectric absorption coefficient, k the wave vector of incident radiation, C the polarization coefficient, γ the cosine of the angles of incidence and refleption in the case of Laue symmetry; the χ are Fourier expansion coefficients ($\chi = \chi_{rh} + i\chi_{ih}$; $\chi_{rh} \gg \chi_{ih}$) which depend on the crystal structure and the wavelength of the incident light. The results show that in the region of the "thick-crystal" approximation the integral intensity of the anomalous transmissivity is highly sensitive

Card 2/3

to the dislocation density. This sensitivity increases rapidly with t. If a calibration curve is available the dislocation densities can be determined from measurements of this integral intensity provided they exceed $5 \cdot 10^2$ cm^{-2}. There are 4 figures and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: June 11, 1962

S/181/62/004/012/020/052
B104/B102

AUTHORS: Yelistratov, A. M., and Kamadzhiyev, P. R.

TITLE: An X-ray examination of the decomposition of a supersaturated solid solution of Ni in Ge

PERIODICAL: Fizika tverdogo tela, v. 4, no. 12, 1962, 3492-3495

TEXT: The specimens were cut from five different p and n-type Ge single crystals having resistivities of 32-35, 33-34, 42-54 and 50-60 ohm·cm (n-type) and 40-45 ohm·cm (p-type), with dislocation densities of $\sim 10^4$ cm^{-2}. The specimens were supersaturated with Ni by diffusion annealing at $\sim 900^{\circ}$C and subsequent rapid quenching. In all cases a liquid eutectic (Ge + GeNi) formed on the surface, from which Ni diffused into the specimens. After the samples had cooled down the solidified eutectic drops were ground away. At room temperature, the resistivities of the specimens saturated with Ni varied between 1.3 and 1.6 ohm·cm, and the nickel concentration between 2.1 and $5.5 \cdot 10^{15}$ cm^{-3}. An X-ray method described in previous papers (DAN SSSR, 125, 538, 1959; FTT, 2, 2950,

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An X-ray examination of the ... S/181/62/004/012/020/052
B104/B102

1960) was used to investigate the isothermal decomposition of the supersaturated solutions at 500, 550, 600 and 650°C. In spite of the low Ni concentration it was possible to detect diffraction effects which are related with the decomposition of the solid solution of Ni in Ge. Analogously to the decomposition of Cu solutions in Ge, the diffraction effects are the result of the scattering from submicro cracks in the matrix. The estimated dimensions of these cracks are $d \leq 40$ Å and $l \geq 600$ Å. The solid solution decomposes in two stages, the matrix of the crystal nuclei being deformed in the second stage. There are 3 figures and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: July 7, 1962

Card 2/2

YELISTRATOV, A.M.; AVINCHUK, R.A.

Calculation of transformations of a crystalline polyhedron. Kristallografiia 7 no.2:199-207 Mr-Ap '62. (MIRA 15:4)

1. Institut poluprovodnikov AN SSSR.
(Crystallography, Mathematical)

YEFIMOV, O.M.; YELISTRATOV, A.M.

Effect of the density of dislocations on the phenomenon of anomalous passage of X rays in germanium. Fiz.tver.tela 4 no.10:2908-2916 O '62. (MIRA 15:12)

1. Institut poluprovodnikov AN SSSR, Leningrad.
(X-ray crystallography) (Germanium)

L 15554-63 EWA(h)/EWT(l)/EWP(q)/EWT(m)/BDS AFFTC/ASD WW/JD

ACCESSION NR: AP3003882 S/181/63/005/007/1869/1879

AUTHORS: Yefimov, O. N.; Yelistratov, A. M.

TITLE: Effect of impurities on anomalous transmission of x-rays in Ge

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1869-1879

TOPIC TAGS: x-ray, Ge, H, Cu, Ni, impurity, crystal lattice, absorption, solubility, defect, heat treatment, dislocation, dislocation density, germanium, hydrogen, copper, nickel

ABSTRACT: The authors have measured the transmission of x-rays through Ge crystals containing impurities of H, Cu, and Ni. The results show that low concentrations of these ($\sim 10^{14}$cm^{-3} H, $\sim 10^{17}$cm^{-3} Cu, $\sim 5.5\cdot10^{15}$cm^{-3} Ni) essentially indicate the integral intensity of anomalous transmission, especially for large thicknesses ($\sim$2 mm), and lead to changes of several percent (in the tens). The principal characteristic for determining degree of lattice distortion by impurity atoms is the interference absorption coefficient. An increase in this coefficient is in complete agreement with an increase in the concentration of injected impurities. The distortions introduced by different impurity atoms in the lattice are not alike. With lower ultimate solubilities the distortions due to injected impurity atoms

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L 15554-63
ACCESSION NR: AP3003882

become greater. The thermal treatment of initial samples (heated in vacuum) and the introduction of impurities by diffusion did not change the dislocation density (at least in the case of low dislocation densities). "In conclusion the authors express their sincere thanks to N. A. Chetverkina for discussing the results, to the student A. T. Pavlenkovich for aid in handling the experimental results, and to the student N. M. Shishkin for participating in development of the method for preparing samples of solid solutions of Cu in Ge suitable for investigating by anomalous transmission of x-rays." Orig. art. has: 4 figures and 3 tables.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, Academy of Sciences, SSSR)

SUBMITTED: 06Feb63 DATE ACQ: 15Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 006 OTHER: 003

Card 2/

L 18723-63 EWP(q)/EWT(m)/BDS AFFTC/ASD Pad JD/HW/WB S/0181/63/005/008/2116/2127

ACCESSION NR: AP3005317

64
60

AUTHORS: Yefimov, O. N.; Yelistratov, A. M.

TITLE: Effect of disturbances arising during exsolution of supersaturated solid solutions of Ni in Ge and of Cu in Ge on the anomalous transmission of x-rays

SOURCE: Fizika tverdogo tela, v. 5, no. 8, 1963, 2116-2127

TOPIC TAGS: solid solution, Ni, Ge, Cu, x-ray, dislocation density, exsolution, integral intensity, disorientation zone, nonhomogeneous deformation, anomalous transmission

ABSTRACT: A considerable effect on the integral intensity of anomalous x-ray transmission has been found experimentally. Preparation of samples has been described previously by the authors (FTT, 5, 1871, 1963). Integral intensities were measured by a two-crystal spectrometer in the Bragg-Laue setup, with the crystal positions (2-2) for reflection from (220) of Ge and with CuK_α radiation (the symmetrical case of Laue). From analysis of changes in integral characteristics during exsolution and reverse solution, some light has been shed on the nature of disturbances in crystals during exsolution. The greatest change in integral characteristics was observed for the exsolution of Ni from Ge in which the limit

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L 18723-63
ACCESSION NR: AP3005317

4

of possible concentration had been obtained. For all samples of solid solution the dislocation density remained lowest during exsolution and reverse solution. On the basis of the experimental data, it is proposed that disorientation zones exist without dislocation boundaries. These zones are thought to be the result of reverse (elastic) nonhomogeneous deformation of the original crystal by seeds of the precipitating phase, these being removed during reverse solution. It is hoped that the results will permit use of anomalous transmission to investigate disturbances arising at various stages of exsolution, including the very initial stage. "In conclusion the authors thank the student A. T. Pavlenkovich for his considerable aid in treating the results of the experiment." Orig. art. has: 4 figures and 2 tables.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, Academy of Sciences, SSSR)

SUBMITTED: 23Feb63 DATE ACQ: 06Sep63 ENCL: 00

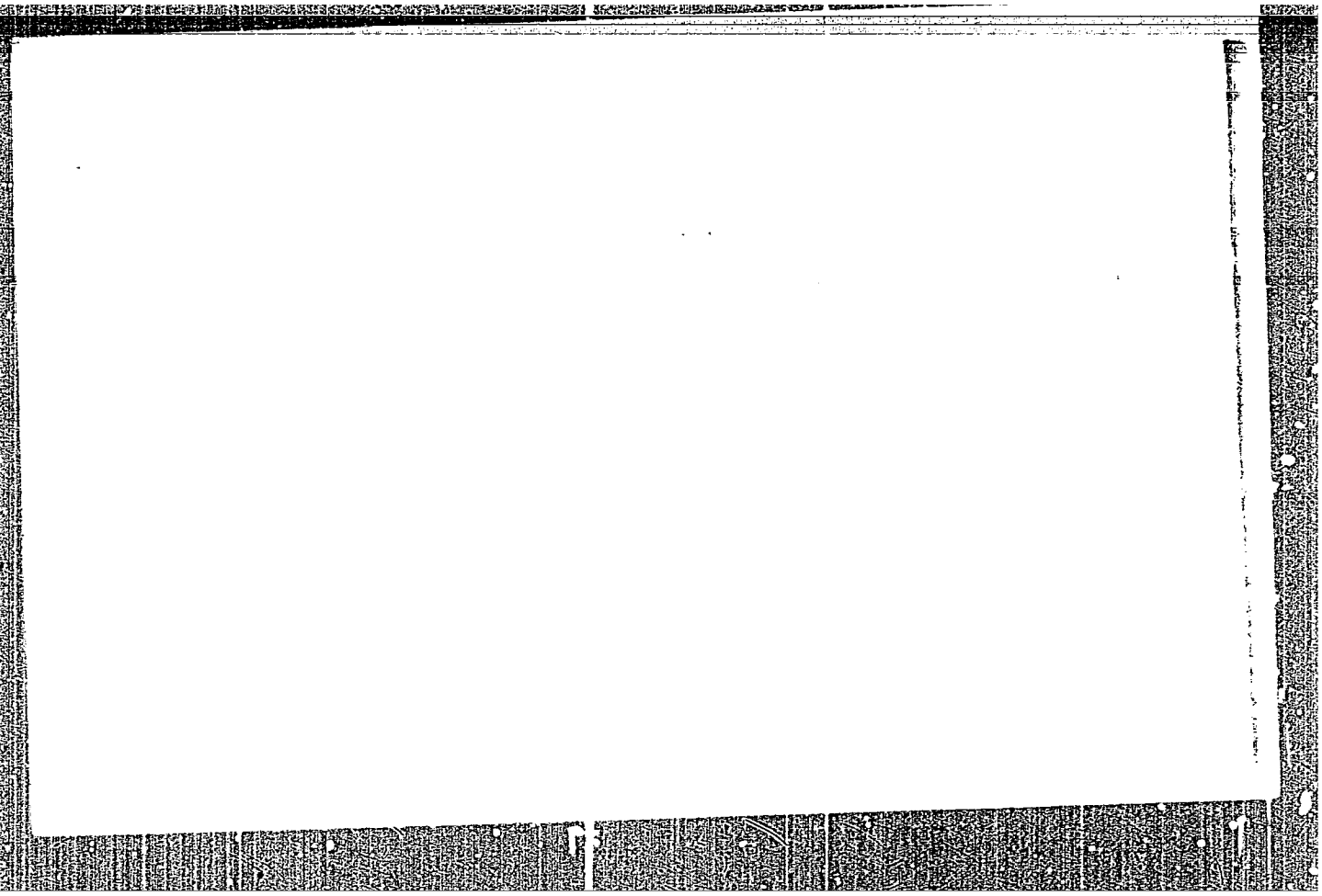
SUB CODE: PH NO REF SOV: 008 OTHER: 001

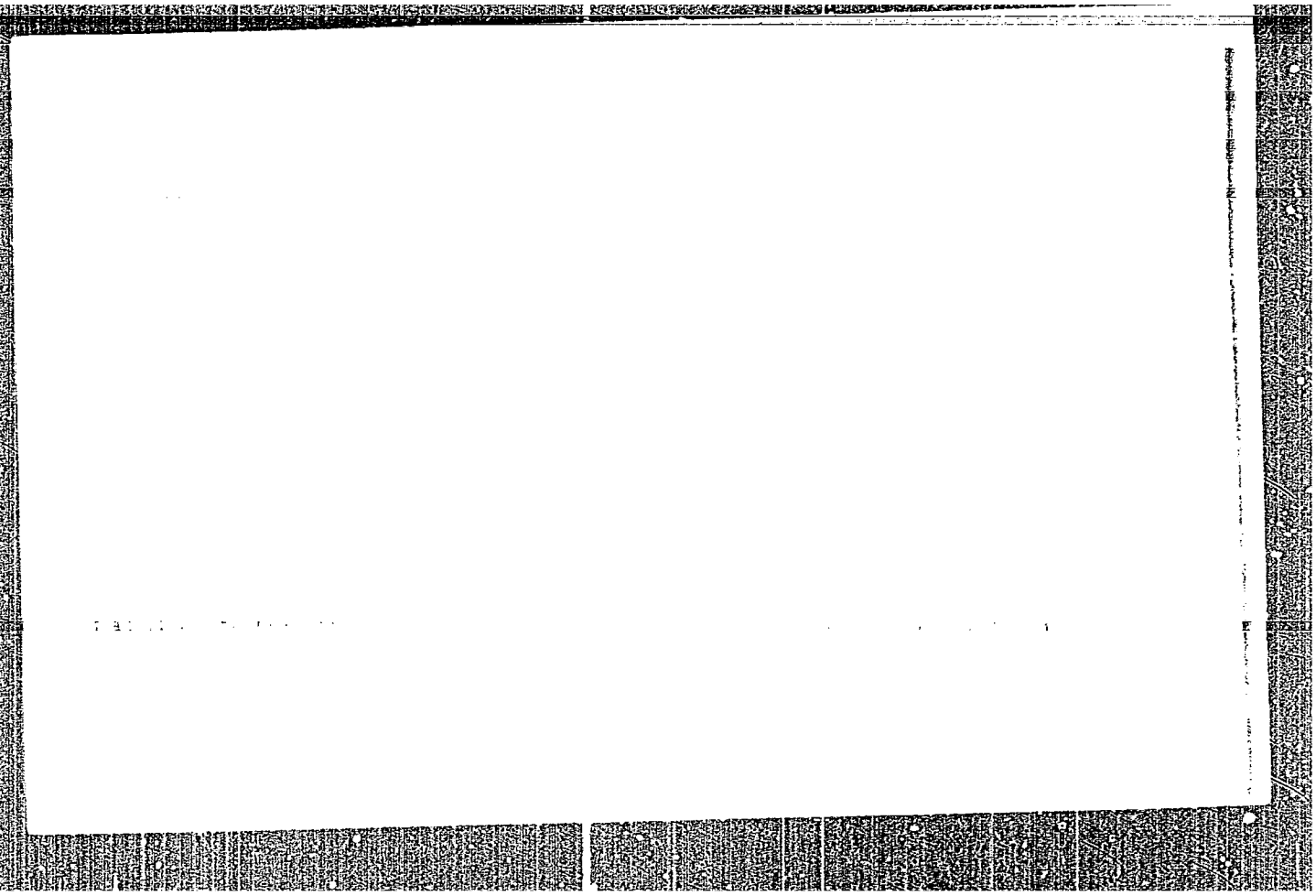
Card 2/2

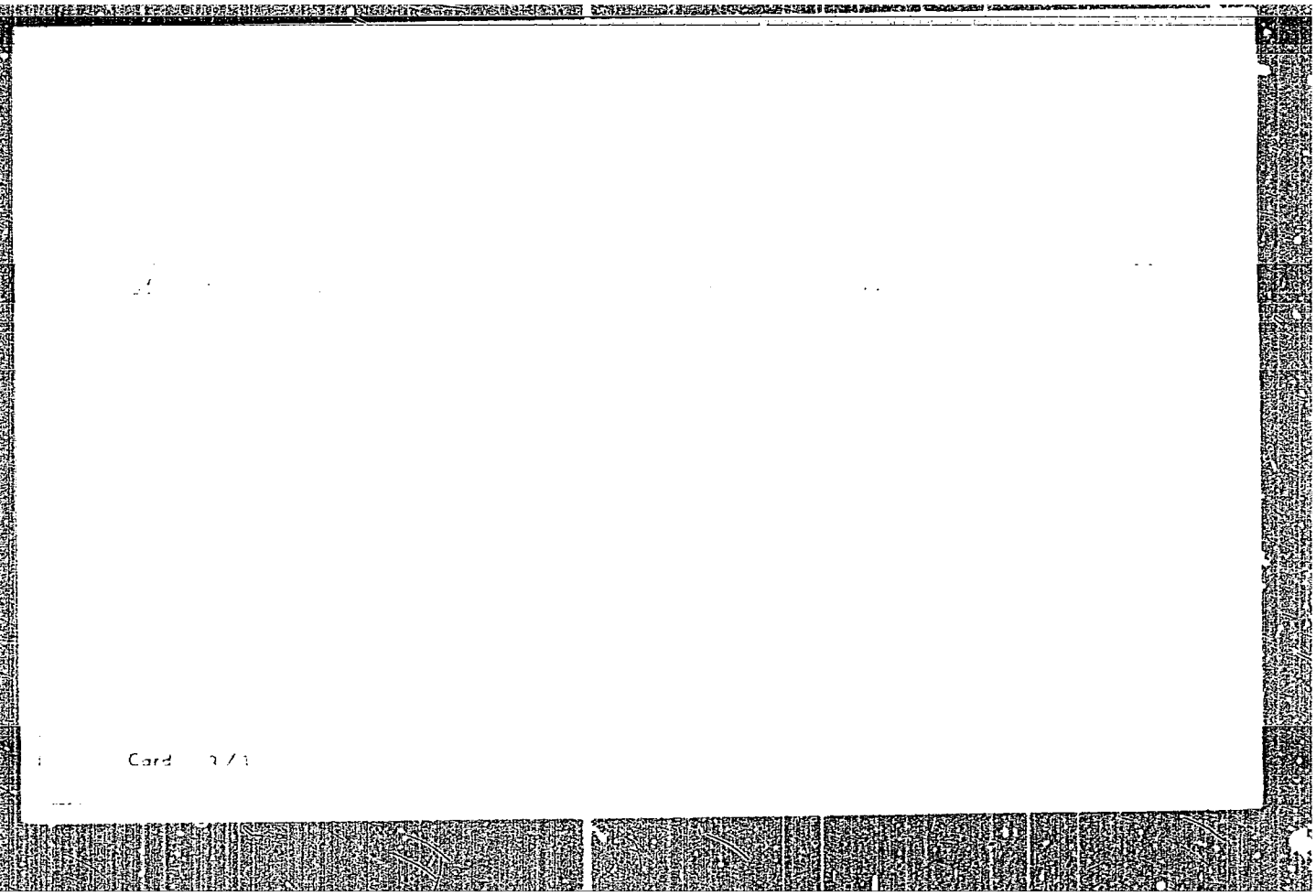
ZVINCHUK, R.A.; YELISTRATOV, A.M.

Shape effect in X-ray scattering by single crystals of supersaturated solid solutions of (K, Na)Cl in process of decomposition. Kristalografiia 8 no.5:715-723 S-O '63. (MIRA 16:10)

1. Institut poluprovodnikov AN SSSR.







L 22953-66 EWT(l)/EWT(m)/T/EWP(t) IJP(c) GG/JD

ACC NR: AP6009666 SOURCE CODE: UR/0181/66/008/003/0809/0815

AUTHORS: Yelistratov, A. M. (deceased); Datsenko, L. I.

ORG: Institute of Semiconductors, AN UkrSSR, Kiev (Institut poluprovodnikov AN UkrSSR)

TITLE: Influence of vacancies and of their coagulation on the anomalous passage of x-rays

SOURCE: Fizika tverdogo tela, v. 8, no. 3, 1966, 809-815

TOPIC TAGS: crystal vacancy, x ray study, germanium single crystal

ABSTRACT: The authors present the results of experimental investigations of the influence of vacancies and their coagulations (formations of microvoids) on the integral characteristics of the anomalous passage of x-rays, which has been shown in earlier investigations by one of the authors (Yelistratov, with O. N. Yefimov, FTT v. 5, 2116, 1963 and earlier) to be related to the thickness of the sample. The investigations were made with dislocation-free samples of n-type germanium in which the amount of electrically active impurities was

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L 22953-66

ACC NR: AP6009666

negligible and could not exert any influence on the intensity of the anomalous passage of the x-rays. Two single crystal samples were used, both grown by the Czochralski method, one in an atmosphere consisting of a mixture of hydrogen and argon and the other in hydrogen only. The preparation of the samples is described in detail. The integral intensities of the anomalous passage were measured with a two-crystal spectrometer based on the URS-50I installation. The data reduction procedure is described in detail. The results show that two processes took place in the crystal, formation of distributed vacancies, and formation of vacancy coagulations. Both exert a smaller influence on the integral characteristics than impurities, although not enough data were obtained in the experiments to make a unique comparison possible. It is concluded that the results can be used to develop an independent method of checking the effect of vacancies on the properties of solids. The authors thank O. N. Yefimov for a discussion of the results, A. D. Belyayev, S.S. Malogolovets for help with the electric measurements, and also A. A. Kilimnik and N. F. Kogdenko for taking part in the measurements of the vibration curves. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/ SUBM DATE: 26Jul65/ ORIG REF: 007/ OTH REF: 005

Card 2/2

L 39930-66 EWT(m)/T/EWI(t)/ETI IJP(c) JD/JW

ACC NR: AP6015456 (N) SOURCE CODE: UR/0181/66/008/005/1394/1401

AUTHOR: Datsenko, L. I.; Yefimov, O. N.; Yelistratov, A. M. (Deceased)

ORG: Institute of Semiconductors AN UkrSSR, Kiev (Institut poluprovodnikov AN UkrSSR); Institute of Semiconductors, AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: Study of defect interaction by the method of anomalous transmission of x-rays

SOURCE: Fizika tverdogo tela, v. 8, no. 5, 1966, 1394-1401

TOPIC TAGS: crystal vacancy, crystal dislocation, crystal impurity, spectrometer, crystal defect

ABSTRACT: The intensity of the anomalous transmission of x-rays was measured on a two-crystal spectrometer in the Bregg-Laue position for the (220) reflections of dislocation-free Ge containing a small amount of impurities. Changes in the integral characteristics of the transmission were analyzed to study the interaction of vacancies with impurity atoms, vacancies, dislocations, and the interaction of defects during retrograde decomposition of the solid solution of Cu in Ge. When the crystal is heated to high temperatures, interaction of defects (vacancies, impurities, dislocations) takes place and appears as a change in the degree of crystal perfection, which can be evaluated quantitatively from $\Delta\mu_i$ and Δy_i; from an analysis of sufficiently large $\Delta\mu_i$ and Δy_i for each specific case, it is possible to establish the nature of the defect in-

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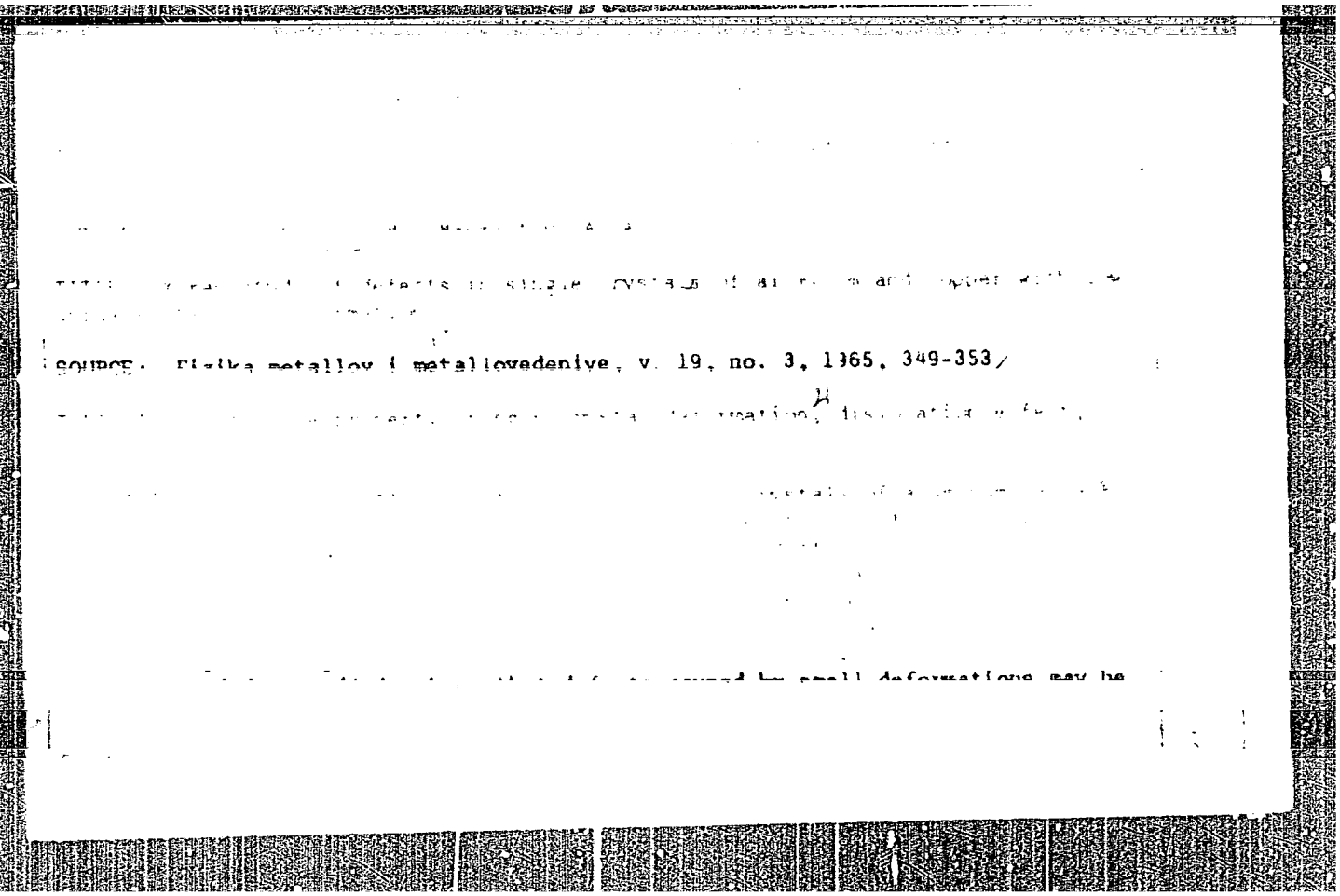
L 39938-66
ACC NR: AP6015456

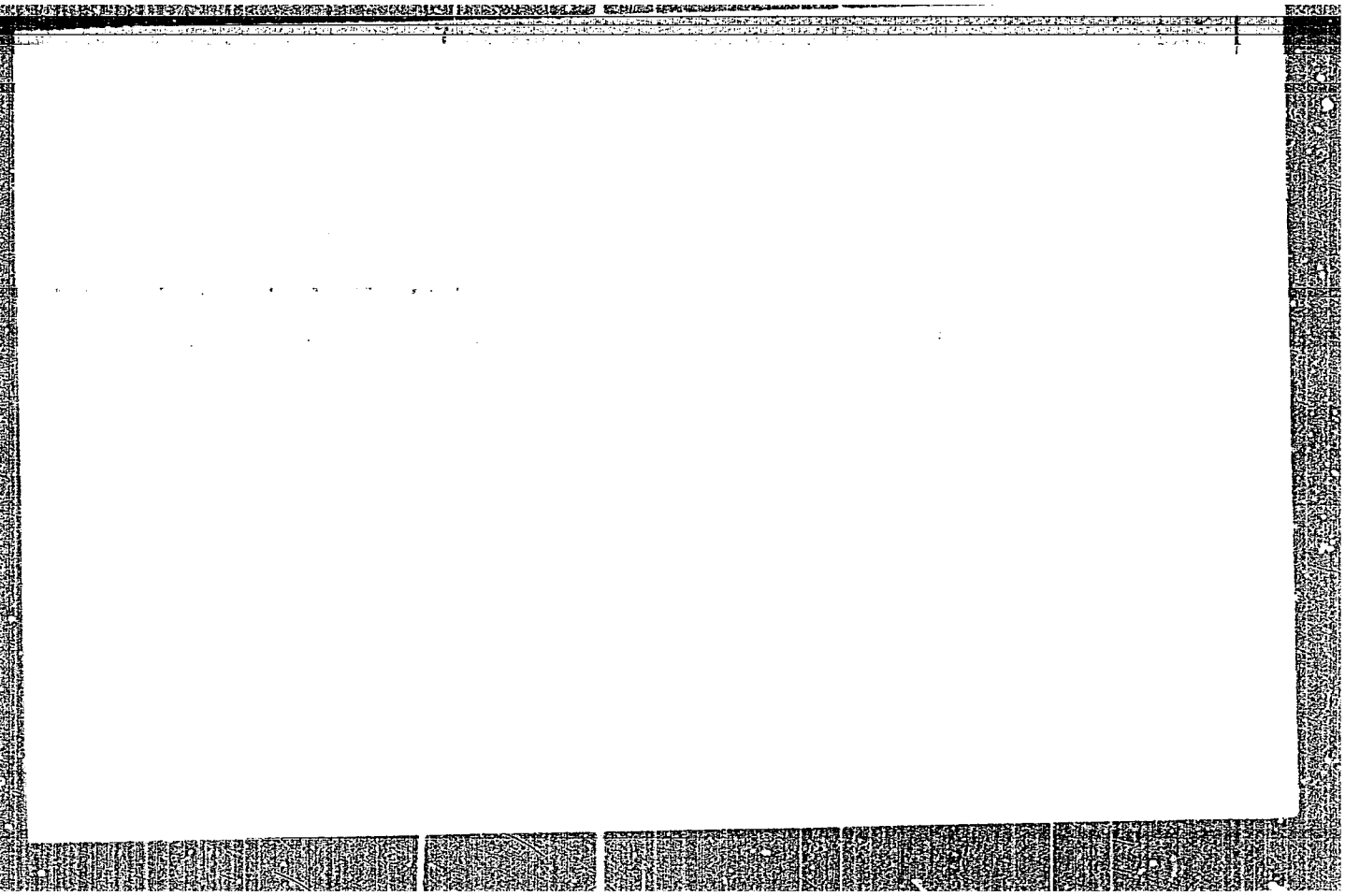
teraction. In the case of uniformly distributed vacancies in the volume of the crystal and interstitial impurities of Cu and Ni, the influence of these defects on the degree of crystal perfection is apparently additive. Gradual cooling of crystals from high temperatures and prolonged low temperature annealing of hardened crystals lead to interaction of statistically distributed vacancies. The diffusion of Cu and Ni results in a partial solution of coagulates through the separation of individual vacancies which facilitate the diffusion process. Vacancies statistically distributed in the volume of the crystal react with dislocations and are absorbed by them. Phenomena are less pronounced during retrograde decomposition which takes place during the annealing of crystal at temperatures above those for maximum solubility. Orig. art. has: 1 figure, 1 table.

SUB CODE: 20/ SUBM DATE: 16Sep65/ ORIG REF: 012/ OTH REF: 004

Card 2/2 HS



source: Fizika metallov i metallovedeniye, v. 19, no. 3, 1965, 349-353/



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001962610008-8"

YELISTRATOV, F.M., kandidat tekhnicheskikh nauk.

Prospects for using free-piston gas generator turbines for ship propulsion (from foreign journals). Sudostroenie 22 no.8:30-35 Ag '56. (MLRA 9:10)

(Marine gas turbines)

YELISTRATOV, F.M., kandidat tekhnicheskikh nauk.

Calculating the indicated efficiency of a free piston gas generator. Sudostroenie 23 no.7:24-28 Jl '57. (MLRA 10:8)
(Marine turbines)

YELISTRATOV, F.M., kand. tekhn.nauk.

Some characteristics of gas turbines used in power plants equipped with free-piston gas generators. Sudostroenie 24 no.11:70-74 N '58. (MIRA 12:1)

(Marine gas turbines)

YELISTRATOV, Flaviy Markianovich; KOLYUKO, Vadim Mikhaylovich; TOMILIN, Mikhail Sergeyevich; KOTSYUBENKO, V.V., inzh., nauchnyy red.; POLYAKOV, I.I., red.; SHISHKOVA, L.M., tekhn.red.

[Power units with free-piston gas generators] Silovye ustanovki so svobodnoporshnevymi generatorami gaza. Leningrad, Gos. soiuznoe izd-vo sudostroit. promyshl., 1959. 297 p. (MIRA 12:8)

(Gas and oil engines)

YELISTRATOV, F.M., kand.tekhn.nauk

Monograph on "Diesel compressors with free pistons" by N.V.Pul'manov. Reviewed by F.M.Elistratov. Energomashinostroenie 6 no.7:44 Jl '60. (MIRA 13:7)
(Air compressors)
(Pul'manov, N.V.)

YELISTRATOV, F.M., kand.tekhn.nauk

High power marine engines [from foreign journals]. Sudostroenie 27 no.9:64-70 S '61. (MIRA 14:11)
(Marine engines)

YELISTRATOV, F. M., kand. tekhn. nauk

Operation of the motorship "Ussuriysk." Sudostroenie 28 no.10: 18-21 O '62. (MIRA 16:1)

(Motorships—Ship handling)

YELISTRATOV, F.M., kand. tekhn. nauk

Prospects of using low-speed, high-power engines on ships.
Sudostroenie 29 no.8:36-39 Ag '63. (MIRA 16:10)

(Marine diesel engines)

L 8303-66 (N) EWT(d)/EWT(m)/EWP(f)/T-2/EWA(c)
ACC NR: AP5028409 SOURCE CODE: UR/0229/65/000/010/0029/0031

1/2
B

AUTHOR: Yelistratov, F. M.

ORG: none

TITLE: New marine engines of the German Democratic Republic

SOURCE: Sudostroyeniye, no. 10, 1965, 29-31

TOPIC TAGS: marine engine, power equipment, fuel consumption, fuel supply system, lubrication, cooling water system/ NVD26 2 marine engine, NVD36 2 marine engine, NVD48 2 marine engine

ABSTRACT: The Carl Libknekht (SKL) works in Magdeburg, East Germany, has developed three new series of marine engines, NVD26.2, NVD36.2, and NVD48.2, which have a piston power equal to the best foreign diesels. The NVD26, with a 180-mm diameter cylinder, has a specific fuel consumption of 172 g/hp-hr, achieved by increasing the average effective cylinder pressure. The NVD36 and NVD48 have a high rpm and pressure. The diesel engines NVD36 and NVD48 have a fuel consumption of 157 g/hp-hr, which is among the world's best. The NVD26.2 does not reverse and operates at 750 rpm for a generator drive or for a ship's propulsion with reversing gear. Among the improvements are a new fuel system with interchangeable jets, an aluminum alloy piston machined in an oval shape, and assuming a cylindrical shape under the thermal

UDC: 621.431.72

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ACC NR: AP5028409

stress of operation, a three-layer piston (steel-lead bronze-babbitt), and a torsional oscillation damper. There are power take-offs on the front of each engine. The engines are provided with mechanical or electrical remote controls, or, for generator use, with a hydraulic rpm regulator. The lubrication system has a twin filter with a magnetic cartridge. The engines are water-cooled with a two-loop system and have either compressed air starters or starter motors. Operation periods between overhauls run up to 30 000 hours. New models are planned for the NVD36.1 and NVD26.2 in 1966, and for the others in 1967. Orig. art. has: 1 table and 6 figures.

SUB CODE: 13/ SUBM DATE: none/ ORIG REF: 002

(leh)

Card 2/2

YELISTRATOV, G.

Automatic weighing, calculating, and conveying of loose materials. Muk.-elev. prom. 27 no.12:13-17 D '61. (MIRA 15:2)

1. Liyepayskiy probochno-linoleumovyy zavod.
(Weighing machines)(Conveying machinery)

YELISTRATOV, G.I.

Assembly of the UDU level indicator in a tank being [illegible]. Transp. i khran. nefti no.5:24-25 (MIRA 17:3)

1. Glavnoye upravleniye po transportu i snabzheniyu nefty'yu i nefte-produktami RSFSR.

BESSONOV, A.N.; GEL'BUKH, L.A.; YELISTRATOV, [redacted]; SMIRNOV, V.A.; TARSKIY, Yu.S., kapitan 2 ranga, red.; CHAPAYEVA, R.I., tekhn. red.

[Underwater search] Podvodnyi poisk. Moskva, Voenizdat, 1963. 93 p. (MIRA 16:10)
(Diving, Submarine) (Underwater television)
(Underwater acoustics)

L 12930-63 EWT(d)/HDS ASD/AFFTC/APGC Pg-4/Pk-4/Pl-4/Po-4/Pq-4 BC

ACCESSION NR: AP3003740 S/0103/63/024/007/0929/0941

72

AUTHOR: Yelistratov, M. R. (Moscow)

TITLE: Determination of dynamic characteristics of nonstationary systems during normal operation

SOURCE: Avtomatika i telemekhanika, v. 24, no. 7, 1963, 929-941

TOPIC TAGS: nonstationary linear system, dynamic-characteristic determination, numerical method, constant parameter, variable parameter, nonlinear system, self-adapting system

ABSTRACT: A general and numerical method is presented for determining the dynamic characteristics of nonstationary linear systems from discrete input and output values. The author first describes a simple method of determining the weight function of a control object with constant parameters and then develops a sufficiently general numerical method for determining the dynamic characteristics of a control object with essentially variable parameters. For developing the method the following assumptions are made: 1) the control object is described by a linear differential or difference equation; 2) the zero input value

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L 12930-63
ACCESSION NR: AP3003740

corresponds to the zero output value; and 3) measurement errors and noises in the control object are not present. For the object with essentially variable parameters an integral equation for the weight function is written on the basis of which the problem of the weight function characterizing the object is reduced to the solution of a system of linear algebraic equations by taking the linear combination of time functions as the approximation of the law of variation of the weight-function ordinates. It is shown how the weight function can be extrapolated beyond the observation interval under the assumption that the law of variation of the dynamic characteristics of the object is the same in the neighborhood of the observation interval as in the interval. The application of the method for linearization of nonlinear dynamic systems with essentially variable parameters in the presence of measurement errors and external disturbances is shown. It is stressed that the method presented is very effective when applied to sampled-control systems; it can also be applied to self-adapting systems. The proposed method makes it possible to determine more accurately the dynamic characteristics of objects with slowly varying parameters. The object described by a linear second-order differential equation is taken as an example. Orig. art. has: 14 formulas and 6 figures.

ASSOCIATION: none

Card 2/2

YELISTRATOV, M.R. (Moskva)

Synthesis of discrete [illegible]ms using a polynomial equation method. Avtom. i telem. 24 no.11:1474-1486 N '63. (MIRA 16:12)

L 2397-66 EWT(d)/FSS-2/EEC(k)-2/EED-2

ACCESSION NR: AP5022977 UR/0103/65/026/008/1379/1384
62-504.1

AUTHOR: Yelistratov, M. R. (Moscow)

TITLE: The accuracy of determination of dynamic characteristics of nonstationary objects

SOURCE: Avtomatika i telemekhanika, v. 26, no. 8, 1965, 1379-1384

TOPIC TAGS: mathematic model, telemetry system, pulse signal

ABSTRACT: In an earlier paper, the author presented a method for the determination (from the discrete values of the input and output signals) of the dynamic characteristics of nonstationary objects during their normal operations. The present paper investigates the accuracy and optimum properties of the estimate of the pulsed transient function of a linear nonstationary object obtained by the same method. The theoretical discussion assumes that 1) the chosen structure of the mathematical model allows the exact description of the law of variation of the unknown pulsed transient function over segments of time equal to the sum of the observation intervals and the time over which the characteristics are extrapolated; 2) the errors of the recording of the input signals are nonexistent, as

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L 2397-66

ACCESSION NR: AP5022977

are the internal noise and external perturbation affecting the object; and 3) the recording errors of the output signal of the object with a given dispersion are independent, not shifted. Normal formulas are given for the calculation of the correlation matrix used for the evaluation of the discrete pulsed transfer function of a linear real nonstationary object. The optimum character of the resulting estimates of the pulsed transfer functions is shown. Orig. art. has: 36 formulas and 2 figures.

ASSOCIATION: None

SUBMITTED: 29Apr64 ENCL: 00 SUB CODE: MA, EC

NO REF SOV: 003 OTHER: 001

Card 2/2

L 9006-66 EWT(d)/EPF(n)-2/EWP(1) LJP(c) WW/BC

ACC NR: AP5027884 SOURCE CODE: UR/0103/65/026/011/1915/1925

AUTHOR: Yelistratov, M.R. (Moscow)

ORG: none

TITLE: Synthesis of a linear discrete filter with limitations in a prescribed part of the system

SOURCE: Avtomatika i telemekhanika, v. 26, no. 11, 1965, 1915-1925

TOPIC TAGS: automatic control system, automatic control theory, linear control system, filter circuit, probability

ABSTRACT: Real linear automatic control systems (ACS) always contain components the characteristics of which may be considered linear only in a certain range of variations of the corresponding physical signals (coordinates). Therefore, a calculation of optimal linear ACS conducted without taking these limitations into account may lead to such a level of instructions that a linear evaluation of the problem becomes inapplicable. In this connection, there arises a need in the synthesis of ACS to calculate an optimal filter providing for the prescribed probability of the operation of the system in the linear zone.

UDC 62-504.1:621.391.172

Card 1/3

ACC NR: AP5027884

If the value of the probability is close to unity the effect of the noise repression of the operational signal may be ignored, and the characteristics of the real system will be close to the theoretical optimum. The present author examines a discrete control system of an object G = P/Q (see Fig. 1) which incorporates an instruction limiter U. The sum of the operational signal, S, and noise, N, is fed to the input of the system.

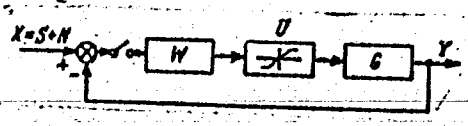

Fig. 1. Object controlled by the discrete system.

L 9006-66

ACC NR: AP5027884

The investigated numerical method for the synthesis of the discrete filter makes it possible to considerably reduce the dispersion at the output of the nonlinear component with the purpose of assuring the prescribed probability of operation of the system in the linear zone. The Lagrange method of finding the conditional extremum and a set of polynomial equations are used in the solution of the problem. This makes it possible to take into account the requirements of stability and the coarseness of the system during the synthesis process itself. Orig. art. has: 5 figures and 36 formulas.

SUB CODE: IE, DP / SUBM DATE: 29Apr64 / ORIG REF: 004

Card 3/3

Yelistratov, N.F.

82166
S/048/60/024/06/11/017
B019/B067

24.6810

AUTHORS: Gusev, V. M., Guseva, M. I., Vlasenko, V. P., Yelistratov, N. P.

TITLE: Investigation of the Interaction of Fast Deuterium Ions With Metals

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 6, pp. 689-693

TEXT: This is the reproduction of a lecture delivered at the 9th All-Union Conference on Cathode Electronics from October 21 to 28, 1959 in Moscow. The authors investigated the sputtering of copper by deuterium ions with energies of 10 - 30 kev. Furthermore, the penetration of deuterium into copper, stainless steel, and some other metals in their bombardment with 25-kev deuterons was studied. Measurements were made in a small electromagnetic separator in which the beam of atomic deuterium ions was focused on the target of the metal to be investigated (Fig.1). Sputtering was determined by measuring the reduction in weight of the target. Fig. 2 graphically shows the measured and the calculated coefficients of sputtering.

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A formula by R. Pease (Ref. 5) was used to calculate this coefficient. The experimental and the theoretical dependence of the coefficient on the ion energy have the same character; the experimental values are, however, somewhat higher which is brought into connection with the assumption used in the calculation that more than half of the atoms in the first three atomic layers are emitted. The penetration of deuterons into the metals, and the desorption of the driven-in atoms on heating the sample were studied by a method which is based on the measurement of the neutron output in the reaction $D(dn)He^3$ which takes place between the driven-in deuterium atoms and the incident deuterons. Fig. 3 graphically shows the dependence of the neutron output on the duration of irradiation of a copper target. A saturation of the metals with deuterium is concluded from the course of the curve. Furthermore, Fig. 4 shows the experimental results with which the dependence of the neutron output on the energy of the incident deuterium ions was determined on an Al-target. It is concluded from these results that the limiting concentration of the driven-in deuterium atoms increases with increasing energy of deuterons. An estimation of the amount of deuterium atoms per cm^2 of copper target with an energy of incident ions of 25 kev yielded a value of approximately $2 \cdot 10^{18}$ particles per cm^2. In this estimation it was

assumed that the driven-in atoms are regularly distributed over the range in which the deuterons are slowed down. Fig. 5 shows the dependence of the neutron output on the target temperature. As may be seen, neutron output at 500°C is about 20% of the initial value. The authors thank I. F. Kvartskhava and N. D. Morgulis for the discussion of some problems arising in these studies. There are 5 figures and 10 references: 6 Soviet, 2 American, 1 Swedish, and 1 German.

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S/057/61/031/006/016/019
B116/B201

21.4210

AUTHORS: Gusev, V. M., Guseva, M. I., Yelistratov, N. P., and Ikonnikov, D. S.

TITLE: The problem of penetration of fast deuterium ions into metals

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 749 - 750

TEXT: A paper by V. M. Gusev, M. I. Guseva, V. P. Vlasenko, N. P. Yelistratov (Ref. 1: Izv. AN SSSR, ser. fizich., 24, no. 6, 689, 1960) contains data regarding the largest possible number of deuterium atoms entering the surface layers of copper, stainless steel, and palladium targets irradiated by 25-kev deuteron beams of different intensities. In the course of further experiments, saturation curves were obtained for platinum, tantalum, silver, aluminum, gold, and titanium targets with deuterium (Fig. 1). For a more complete congelation of the oil vapors of the diffusion pump, an additional trap cooled by liquid nitrogen was placed in the vacuum chamber. Fig. 1 shows that most deuterium atoms are able to penetrate into titanium; more precisely, 14 times the number that penetrate into stainless steel (which absorbs the lowest amount of deuterium). If titanium is irradiated

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with a deuteron beam having an energy of 25 kev and an intensity of 2 ma/cm^2, the total neutron yield per cm^2 of wall will amount to $2.5 \cdot 10^6$ neutrons/second. Whenever a target was used several times, the thin surface layer saturated with deuterium during the previous experiment was mechanically removed before starting the experiment. The neutron yield always began from zero. On the other hand, if the target irradiation was interrupted for a number of hours or days, the former value of neutron yield was restored after irradiation was recommenced regardless of whether the target was placed in a vacuum or in air. This proves that deuterium does not diffuse into the interior of the metal, not even in titanium. The solubility of hydrogen in titanium is about 10^4 times as high as in copper, silver, aluminum, platinum, and stainless steel (Ref. 2: S. Deshman. Nauchnyye osnovy vakuumnoy tekhniki (Scientific basis of vacuum technology), M., p. 451, 1950.) Unlike the curves of other metals, the saturation curves of silver and gold with deuterium display maxima (Fig. 1). Further studies are required for clarifying the causes of their formation. The indications of the neutron recorder were photographed by a motion-picture camera and the authors suc-

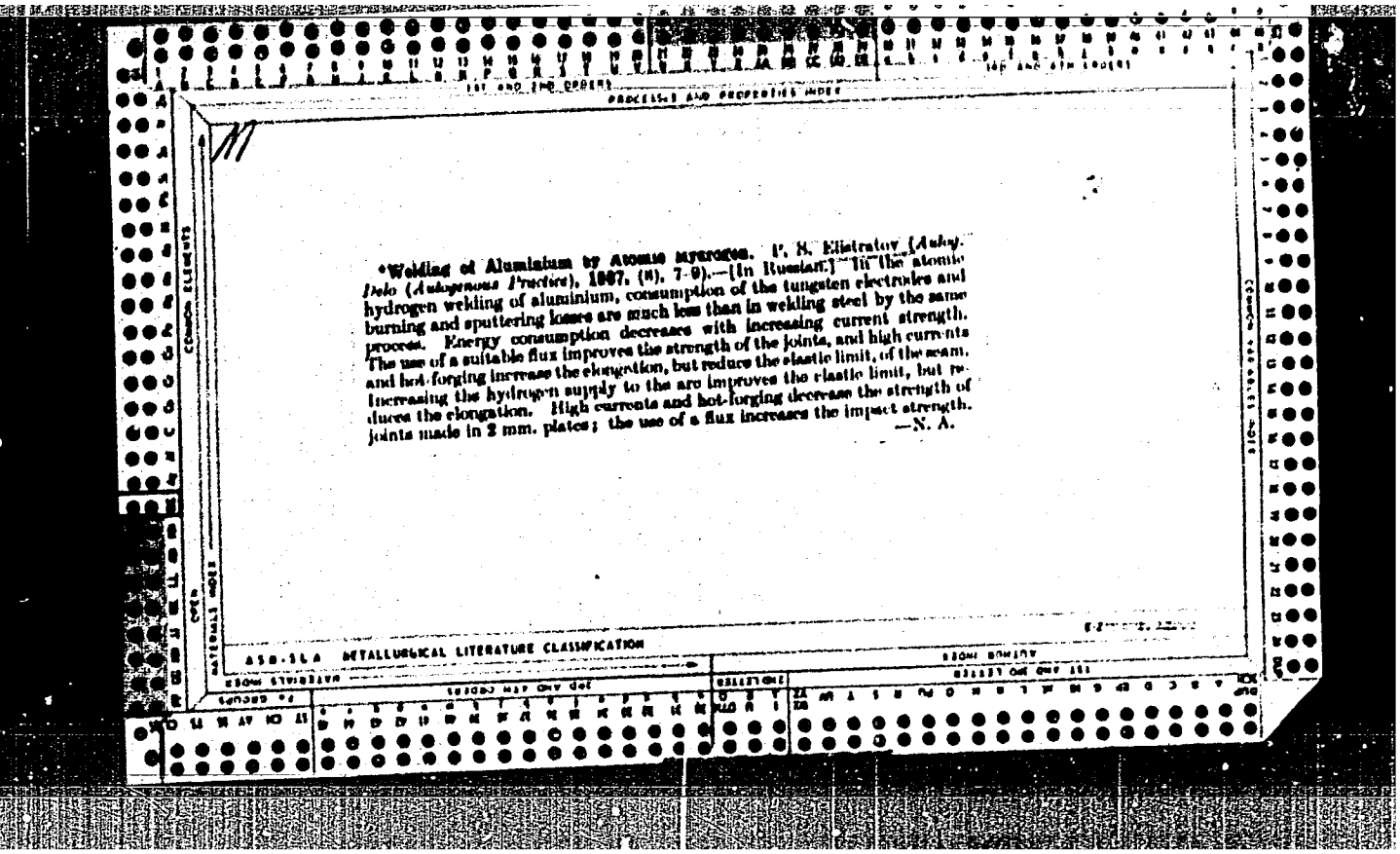
ceeded in determining the time dependence of the neutron yield in the first fractions of a second after beginning with the irradiation of the target by a deuteron beam. Fig. 2 shows the initial section of this curve for a stainless steel target. The linear course of this section proves that the gas generation coefficient of deuterium is almost zero during the first seconds of irradiation (when disregarding the reflection of deuterium ions from the target). After that, the neutron yield rises more slowly with time, and the curve tends toward saturation (Fig. 1). The conclusion may be drawn therefrom that equilibrium is established between the deuterium amounts reaching the target and those leaving the target due to diffusion and sputtering. There are 2 figures and 2 Soviet-bloc references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Gruz. SSR Sukhumi (Institute of Physics and Technology, AS Gruzinskaya SSR, Sukhumi)

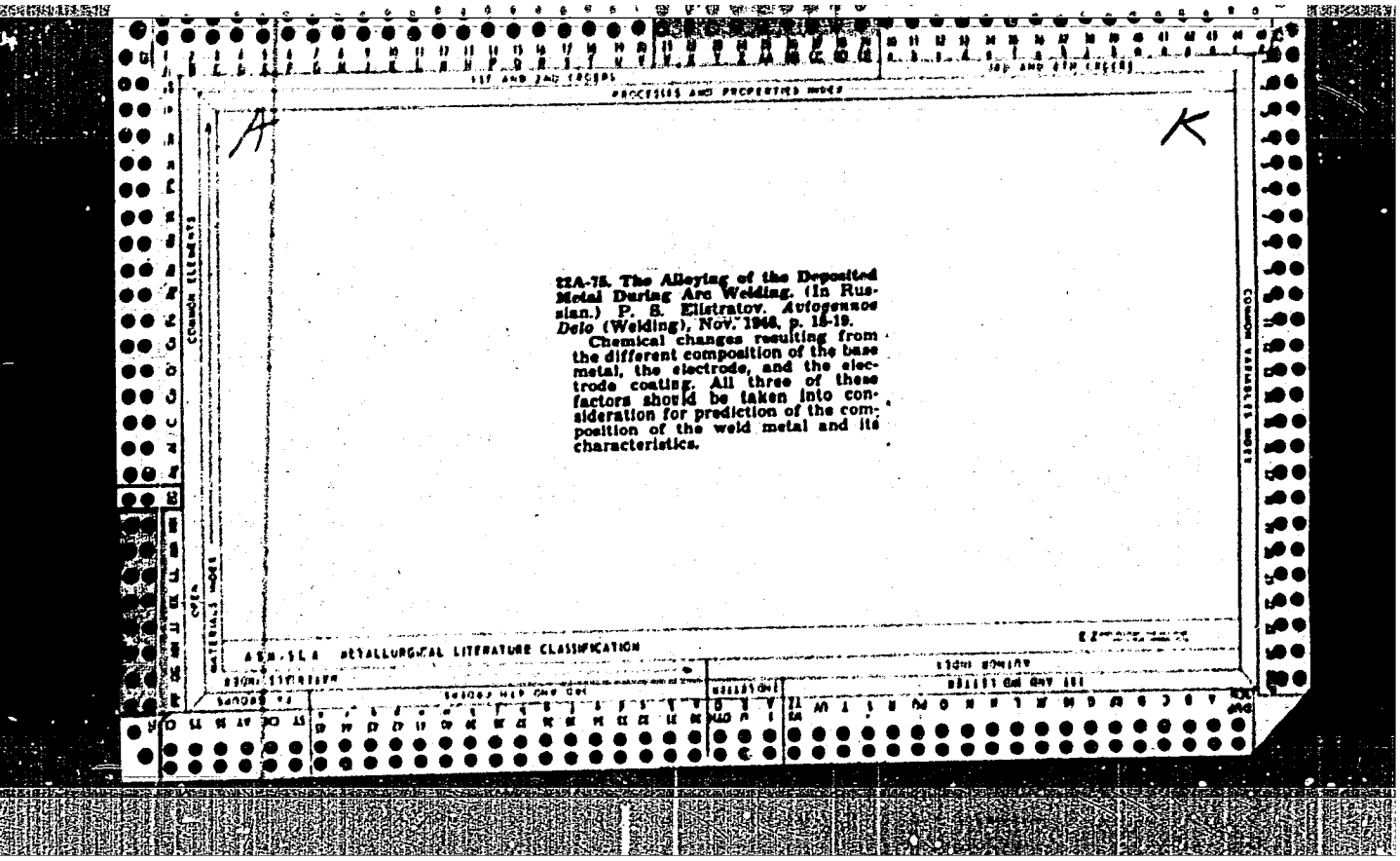
SUBMITTED: December 26, 1960

YELISTRATOV, Petr Matveyevich; PLAKHTIN, I.A., red.; LYSIK, O.I., tekhn. red.

[Seven-year plan of Kherson Province in operation] Semiletka Khersonshchiny v deistvii. Izd.2., ispr. i dop. broshishiury "Khersonshchina v semiletke." Kherson, Khersonskoe knizhno-gazetnoe izd-vo, 1961. 74 p. (MIRA 14:9)
(Kherson Province--Economic conditions)

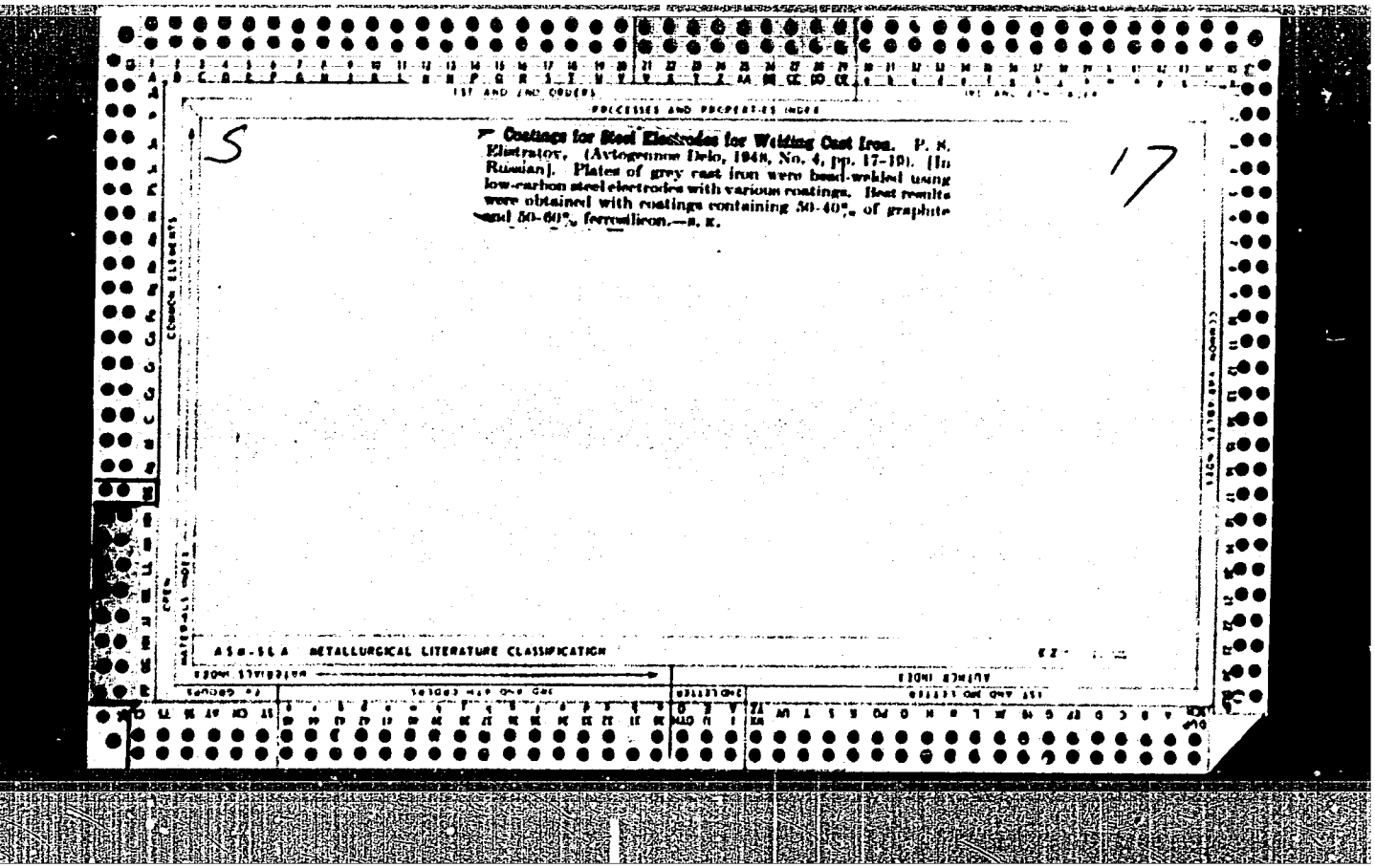


•Welding of Aluminium by Atomic Hydrogen. P. S. Elistratov. *Avtog. Delo (Autogenous Practice)*, 1937, (8), 7-9.—[In Russian.] In the atomic hydrogen welding of aluminium, consumption of the tungsten electrodes and burning and sputtering losses are much less than in welding steel by the same process. Energy consumption decreases with increasing current strength. The use of a suitable flux improves the strength of the joints, and high currents and hot-forging increase the elongation, but reduce the elastic limit, of the seam. Increasing the hydrogen supply to the arc improves the elastic limit, but reduces the elongation. High currents and hot-forging decrease the strength of joints made in 2 mm. plates; the use of a flux increases the impact strength. —N. A.



11A-15. **The Alloying of the Deposited Metal During Arc Welding.** (In Russian.) P. S. Elistratov. *Avtogennoe Delo* (Welding), Nov. 1948, p. 18-19.

Chemical changes resulting from the different composition of the base metal, the electrode, and the electrode coating. All three of these factors should be taken into consideration for prediction of the composition of the weld metal and its characteristics.



5

Coatings for Steel Electrodes for Welding Cast Iron. P. S. Elistratov. (Avtogennoe Delo, 1948, No. 4, pp. 17–19). [In Russian]. Plates of grey cast iron were bead-welded using low-carbon steel electrodes with various coatings. Best results were obtained with coatings containing 30–40% of graphite and 50–60% ferrosilicon.—B. K.

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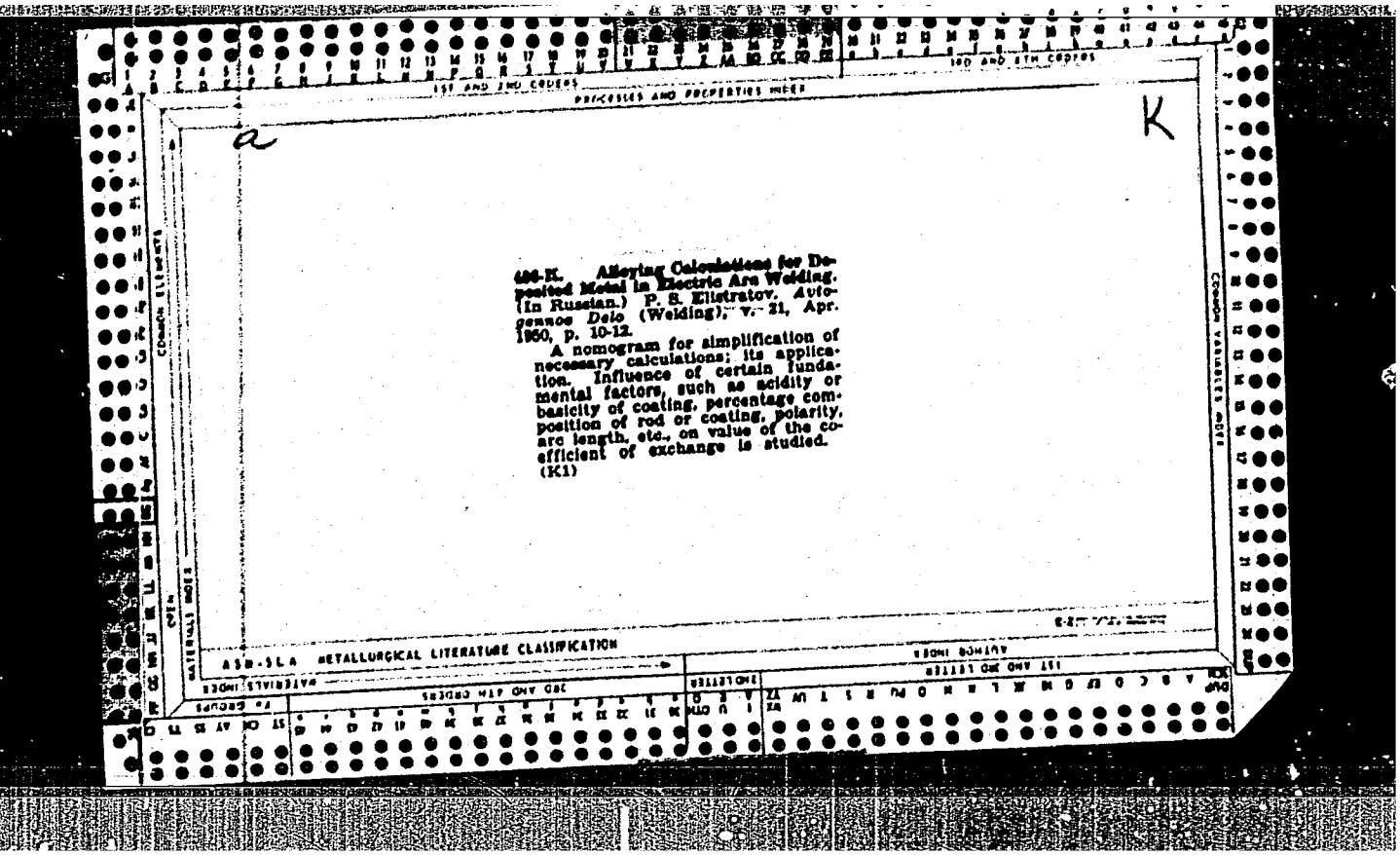
A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

YELISTRATOV, P.S.

Mor., Plant im. Il'ich, -c1948-,

Cand. Technical Sci.

"Electrodes for welding of cast iron rollers," Stal'
No. 5, 1948



a

K

496-K. Alloying Calculations for Deposited Metal in Electric Arc Welding. (In Russian.) P. S. Elistratov. *Avtogennoe Delo* (Welding), v. 21, Apr. 1950, p. 10-12.

A nomogram for simplification of necessary calculations; its application. Influence of certain fundamental factors, such as acidity or basicity of coating, percentage composition of rod or coating, polarity, arc length, etc., on value of the coefficient of exchange is studied. (K1)

MR

K

373-K. **Electrical-Contact Resistance During Fusion Butt Welding.** (In Russian.) P. S. Elistratov. *Avtogennoe Delo*, v. 22, Aug. 1951, p. 14-16.

Experimental values are broken into component parts. Current density, rate of fusion, and type of welding machine (two types) were the principal variables. Data are tabulated and charted for low-carbon steel. (K1, CN)

ELISTRATOV, P. S.

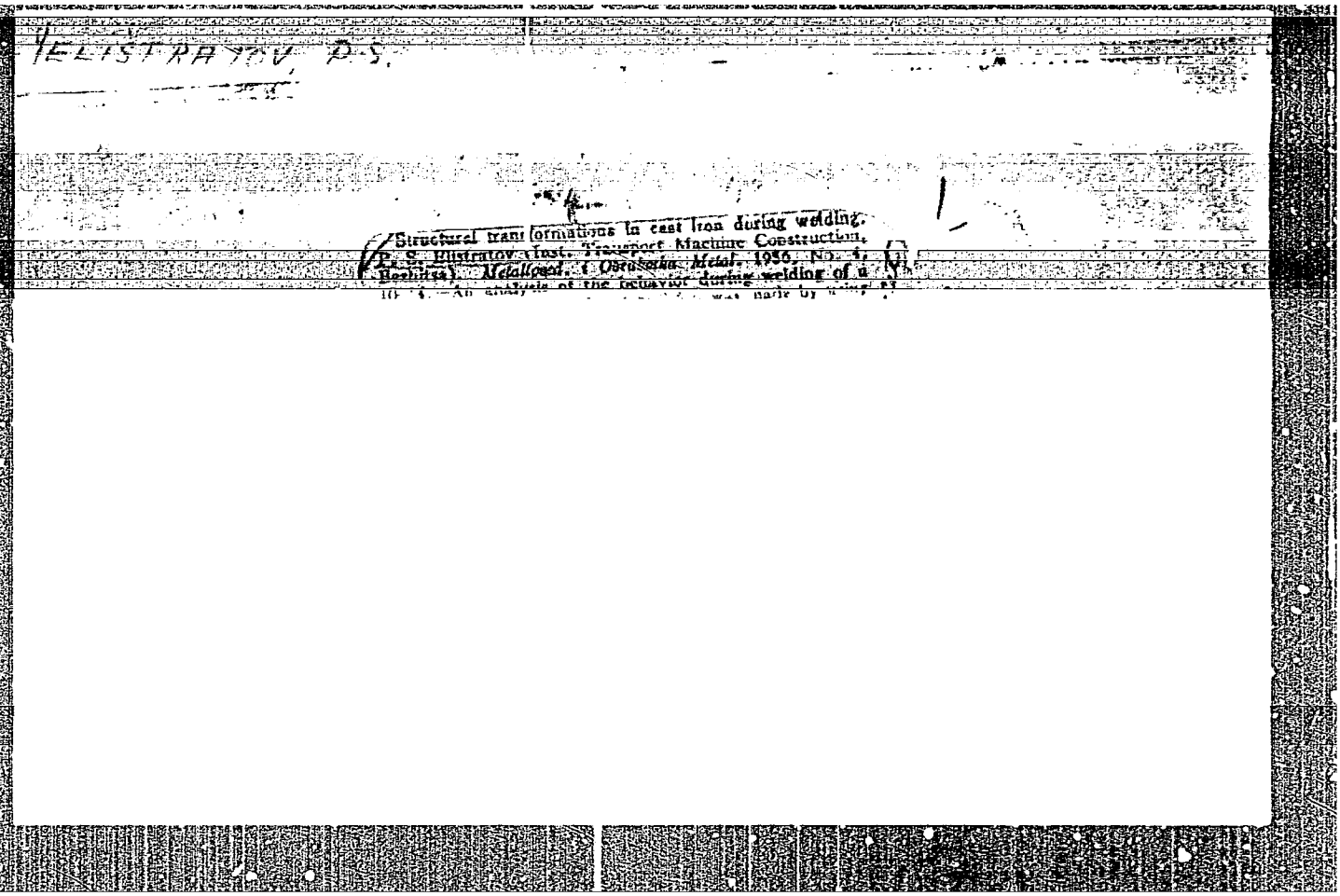
ELISTRATOV, P. S. --"Metallurgical Fundamentals of Electric Arc-Welding of Cast Iron with Steel Electrodes." * (Dissertations for Degrees in Science and Engineering Defended at USSR Higher Educational Institutions) Min of Higher Education USSR, Leningrad Polytechnic Inst imeni M. I. Kalinin, Leningrad, 1955

SO: Knizhnaya Letopis', No. 25, 18 Jun 55

* For Degree of Doctor of Technical Sciences

ELISTRATOV, P.S., kandidat tekhnicheskikh nauk

Cast iron welding. Vest.mash.35 no.7:44-46 J1'55. (MLRA 8:10)
(Cast iron--Welding)



YELISTRATOV, D.S.

Structural transformations in cast iron during welding. Transport Machine Construction. D. S. Elistratov. (Inst. Transport Machine Construction, Academy of Sciences). *Metalloved. i Obrabotka Metal.* 1956, No. 1, [illegible]

[illegible] An analysis of the behavior during welding of a [illegible]

YELISTRATOV, P.S.

USSR/Engineering - Welding, Equipment, Design — Aug 51

"Electric Resistance of Contact in Butt Fusion Welding," Docent P. S. Yelistratov, Cand Tech Sci

"Avtogen Delo" No 8, pp 14-16

Develops empirical formulas, connecting resistance of liquid metal, rate of fusion and cd. Also presents this relationship graphically. Calcd resistance of liquid metal permits detn of elec resistance of parts upon heating with melting, and calcns of secondary circuit parameters of welding machine.

200T51

YELISTRATOV, P.S.

Consultation. Stan.i instr. 24 no.7:39 Jl '53. (MLRA 6:8)
(Electric welding)

112-57-7-14486

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1957, Nr 7, pp 105-106 (USSR)

AUTHOR: Yelistratov, P. S.

TITLE: Equation for Electric Resistance of a Contact (Uravneniye elektricheskogo soprotivleniya kontakta)

PERIODICAL: Tr. Bezhitsk. in-ta transp. mashinostr. (Transactions of the Bezhitsa Institute of Transport-Machine Construction), 1955, Nr 14, pp 93-108

ABSTRACT: An equation for electrical resistance of a contact is suggested, deduced from an assumption that a contact between two surfaces is formed by the touching of bumps that result from machining the surfaces. Each bump is assumed to have the shape of the frustum of a cone. The equation has the following form:

$$R_k = \frac{2h\rho\sqrt{\sigma}}{\sqrt{F}\cdot\sqrt{P}}, \quad (1),$$

where R_k is the contact resistance, h is the frustum height, ρ is the resistivity of the contact material, σ is a factor characterizing mechanical resistance to compression of the material, F is the

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Equation for Electric Resistance of a Contact

total area of the contacting surfaces, and P is the pressure on the contacts. Data is presented on experimental investigation of the dependence of contact resistance on various quantities entering equation (1). Experimental relations $R_k = f(P)$ determined for steel-steel, copper-copper, and steel-copper contacts well agree with theoretical relations obtained from equation (1). It was assumed: for copper $\rho_{cu} = 0.0175 \times 10^{-4}$ ohm. cm, $\sigma_{cu} = 40$ kg/mm^2, $h_{cu} = 8 \times 10^{-3}$ mm; for steel $\rho_{st} = 0.012 \times 10^{-4}$ ohm. cm, $\sigma_{st} = 60$ kg/mm^2, $h_{st} = 12 \times 10^{-3}$ mm. No influence of contact surface machining on the contact-resistance value was detected. A copper contact surface treated with a grinding wheel of grain-size 40 showed practically the same contact resistance as a surface treated with a grinding wheel of grain-size 120. The pressure was varied from 40 to 600 kg in that experiment. An assumption is advanced that the essential dependence of R_k on h (h is associated with surface machining) as is shown by the above equation, holds true only for light contact pressures. The experimental relationship $R_k = f_1(F)$ has the nature of a parabola which agrees with equation (1). A variation of current density within 0.05-0.25 a/mm^2

112-57-7-14486

Equation for Electric Resistance of a Contact

on the steel-steel and copper-copper contact surfaces, with pressures of 1-2 kg/mm^2, does not affect the value of R_k. It is pointed out that, of all factors determining the contact resistance, the greatest role belongs to the contacting materials. Other factors (like converging of current stream lines, absorbed gas films, etc.) play only a secondary role. A precision ammeter with a set of shunts and galvanometers was used in the experimental determination of contact resistance. Bibliography: 11 items.

I.N. Ye.

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YELISTRATOV, P.S.

SChS electrodes for cast iron welding. Stan. i instr. 26 no.7: 35 Jl '55. (MLRA 8:9)

(Electric welding)

Yelistratov, Petr Savel'yevich.

Metallurgicheskiye osnovy svarki chuguna (Metallurgical Principles of Cast Iron Welding) Moscow, Mashgiz, 1957. 154 p. 6,000 copies printed.

Ed.: Zvegintseva, K.V., Engineer; Ed. of Publishing House: Mezhova, V.A.; Tech. Ed.: Tikhanov, A.Ya. Reviewer: Ivanov, B.G., Candidate of Tech. Sciences; Managing Ed. for literature on heavy machine building (Mashgiz): Golovin, S.Ya., Engineer.

PURPOSE: This book was written for engineers and technicians dealing with welding of cast iron. It can also be used by students studying the principles of welding.

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Metallurgical Principles of Cast Iron Welding (Cont.)

COVERAGE: The author emphasizes the importance of grey cast iron in machine building and estimates that the production of cast iron will reach 53 million tons in 1960, 12-15 million tons of which will be used in machine building. Welding of cast iron is claimed to be the most important method of correcting flaws in castings - about 3% of rejects can thus be saved, constituting an annual saving of 1.4 billion rubles. Properly applied welding methods could also be used in the construction of complex structures composed of cast iron elements. The author further claims that this is the first effort to analyze theoretically from the metallurgical point of view, the most important problems of cast iron welding. There are numerous tables, diagrams and formulae.

Metallurgical Principles of Cast Iron Welding (Cont.)

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Metallurgical Principles of Cast Iron Welding (Cont.)

Metallurgical Principles of Cast Iron Welding (Cont.)

There are 18 references of which 13 are Soviet, 3 English and 2 German.

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Metallurgical Principles of Cast Iron Welding (Cont.)

There are 19 references of which 8 are Soviet, 6 German and 5 English.

AVAILABLE: Library of Congress

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18(7); 25(1) PHASE I BOOK EXPLOITATION SOV/3094

Yelistratov, Petr Savel'yevich

Svarochnyye svoystva chuguna (Welding Properties of Cast Iron) Moscow, Mashgiz, 1959. 145 p. Errata slip inserted. 5,000 copies printed.

Ed.: K. V. Zvegintseva, Engineer; Ed. of Publishing House: N. S. Stepanchenko; Tech. Ed.: V. D. El'kind; Managing Ed. for Literature on Heavy Machine Building (Mashgiz): S. Ya. Golovin, Engineer.

PURPOSE: This book is intended for technical personnel working in industrial plants, repair shops, and supply centers. It may also be useful to students specializing in casting and welding.

COVERAGE: The special characteristics of cast iron and their relationship to welding properties are discussed. Physical properties are noted. Metallographic analyses of weld metal in the form of cast iron, steel, and copper alloys are given, and questions of crack formation, mechanical properties, and machinability of welded joints are discussed. No personalities are mentioned. There are 47 references: 23 Soviet, 15 English, and 9 German.

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